

Third Main Operating Base (MOB 3)

KC-46A Beddown



DRAFT

KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN ENVIRONMENTAL IMPACT STATEMENT (EIS)



VOLUME I

Prepared for:
Air Force Reserve Command
Air Force Civil Engineer Center
Air Mobility Command
United States Air Force

November 2016

Privacy Advisory

Your comments on this Draft EIS are requested. Letters or other written comments provided may be published in the Final EIS. Comments will normally be addressed in the EIS and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EIS or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EIS.

COVER SHEET

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KC-46A THIRD MAIN OPERATING BASE (MOB 3) BEDDOWN

- a. **Responsible Agency:** United States Air Force (USAF)
- b. **Report Designation:** Draft Environmental Impact Statement (EIS)
- c. **Inquiries:** For further information on this Draft EIS, contact Mr. Hamid Kamalpour, AFCEC/CZN, Bldg 171, 2261 Hughes Ave, Ste 155, Lackland AFB, TX 78236-9853.
- d. **Proposed Action:** Establish the KC-46A Third Main Operating Base (MOB 3). The MOB 3 mission includes the basing of 12 KC-46A aircraft, facilities and infrastructure, and manpower at a USAF installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The purpose of the MOB 3 mission is to provide a fully capable, combat operational KC-46A aerial refueling squadron to accomplish aerial refueling and related missions.
- e. **Alternatives:** The Strategic Basing Process resulted in the identification of Seymour Johnson AFB in North Carolina as the preferred alternative and Grissom Air Reserve Base (ARB) in Indiana, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts as reasonable alternatives for the MOB 3 mission.
- f. **Abstract:** This EIS was prepared by the USAF in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 *United States Code [USC]* 4321 et seq.), as implemented by the Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations [CFR]* 1500–1508), and Air Force Instruction (AFI) 32-7061, “The Environmental Impact Analysis Process” (as promulgated in 32 *CFR* 989). The USAF has prepared this EIS to assess the potential environmental consequences associated with the implementation of the KC-46A MOB 3 mission. The USAF identified MOB 3 alternatives using operational analysis, the results of site surveys, and military judgment factors. Resources addressed in the EIS include noise, air quality, safety, soils and water, biological resources, cultural resources, land use, infrastructure, hazardous materials and waste, socioeconomics, and environmental justice and the protection of children.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
LIST OF TABLES	vi
LIST OF FIGURES	x
ACRONYMS AND ABBREVIATIONS.....	xiii
1.0 PURPOSE AND NEED FOR KC-46A THIRD MAIN OPERATING BASE BEDDOWN	1-1
1.1 PURPOSE OF THE THIRD MAIN OPERATING BASE BEDDOWN	1-2
1.2 NEED FOR THE THIRD MAIN OPERATING BASE BEDDOWN	1-2
1.3 BACKGROUND FOR MEETING THE PURPOSE AND NEED	1-2
1.4 AIRCRAFT CHARACTERISTICS	1-3
1.4.1 Aircraft Characteristics of the KC-135	1-3
1.4.2 Aircraft Characteristics of the KC-46A	1-4
1.5 PUBLIC AND AGENCY INVOLVEMENT	1-5
1.5.1 Scoping Process	1-5
1.5.2 Public and Agency Review	1-7
1.6 TRIBAL CONSULTATION	1-7
1.7 ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT	1-7
2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES.....	2-1
2.1 OVERVIEW	2-1
2.2 NARROWING PROCESS FOR ALTERNATIVE BASES	2-1
2.2.1 Alternative Identification Process Methodology	2-2
2.3 KC-46A MISSION-SPECIFIC REQUIREMENTS	2-4
2.3.1 KC-46A MOB 3 Mission-Specific Requirements	2-5
2.4 PREFERRED AND REASONABLE ALTERNATIVES.....	2-8
2.5 DESCRIPTION OF ALTERNATIVE BASING LOCATIONS	2-8
2.5.1 Grissom Air Reserve Base, Indiana	2-8
2.5.2 Seymour Johnson Air Force Base, North Carolina.....	2-15
2.5.3 Tinker Air Force Base, Oklahoma	2-23
2.5.4 Westover Air Reserve Base, Massachusetts	2-29
2.6 NO ACTION ALTERNATIVE	2-36
2.7 COMPARISON OF ENVIRONMENTAL CONSEQUENCES	2-37
2.8 MITIGATION.....	2-45
2.8.1 Measures Proposed to Reduce Potential for Environmental Impacts	2-45
2.9 MANAGEMENT ACTIONS	2-48
2.10 UNAVOIDABLE IMPACTS	2-48

TABLE OF CONTENTS (Continued)

<u>CHAPTER</u>		<u>PAGE</u>
3.0	BASE-AFFECTED ENVIRONMENT	3-1
3.1	GRISSOM AIR RESERVE BASE	3-1
3.1.1	Acoustic Environment	3-1
3.1.2	Air Quality	3-5
3.1.3	Safety	3-8
3.1.4	Soils and Water	3-10
3.1.5	Biological Resources	3-12
3.1.6	Cultural Resources	3-15
3.1.7	Land Use	3-16
3.1.8	Infrastructure	3-17
3.1.9	Hazardous Materials and Waste	3-19
3.1.10	Socioeconomics	3-20
3.1.11	Environmental Justice and other Sensitive Receptors	3-23
3.2	SEYMOUR JOHNSON AIR FORCE BASE	3-25
3.2.1	Acoustic Environment	3-25
3.2.2	Air Quality	3-29
3.2.3	Safety	3-31
3.2.4	Soils and Water	3-33
3.2.5	Biological Resources	3-35
3.2.6	Cultural Resources	3-38
3.2.7	Land Use	3-38
3.2.8	Infrastructure	3-39
3.2.9	Hazardous Materials and Waste	3-41
3.2.10	Socioeconomics	3-42
3.2.11	Environmental Justice and other Sensitive Receptors	3-45
3.3	TINKER AIR FORCE BASE	3-49
3.3.1	Acoustic Environment	3-49
3.3.2	Air Quality	3-53
3.3.3	Safety	3-55
3.3.4	Soils and Water	3-56
3.3.5	Biological Resources	3-60
3.3.6	Cultural Resources	3-64
3.3.7	Land Use	3-65
3.3.8	Infrastructure	3-66
3.3.9	Hazardous Materials and Waste	3-68
3.3.10	Socioeconomics	3-70
3.3.11	Environmental Justice and other Sensitive Receptors	3-72
3.4	WESTOVER AIR RESERVE BASE	3-77
3.4.1	Acoustic Environment	3-77
3.4.2	Air Quality	3-81
3.4.3	Safety	3-82
3.4.4	Soils and Water	3-84
3.4.5	Biological Resources	3-86
3.4.6	Cultural Resources	3-89

TABLE OF CONTENTS (Continued)

<u>CHAPTER</u>		<u>PAGE</u>
	3.4.7 Land Use	3-90
	3.4.8 Infrastructure	3-91
	3.4.9 Hazardous Materials and Waste	3-93
	3.4.10 Socioeconomics	3-94
	3.4.11 Environmental Justice and other Sensitive Receptors	3-96
4.0	ENVIRONMENTAL CONSEQUENCES	4-1
4.1	GRISSOM AIR RESERVE BASE	4-1
	4.1.1 Acoustic Environment	4-1
	4.1.2 Air Quality	4-5
	4.1.3 Safety	4-9
	4.1.4 Soils and Water	4-11
	4.1.5 Biological Resources	4-13
	4.1.6 Cultural Resources	4-14
	4.1.7 Land Use	4-14
	4.1.8 Infrastructure	4-15
	4.1.9 Hazardous Materials and Waste	4-18
	4.1.10 Socioeconomics	4-20
	4.1.11 Environmental Justice and other Sensitive Receptors	4-22
4.2	SEYMOUR JOHNSON AIR FORCE BASE	4-23
	4.2.1 Acoustic Environment	4-23
	4.2.2 Air Quality	4-27
	4.2.3 Safety	4-31
	4.2.4 Soils and Water	4-33
	4.2.5 Biological Resources	4-34
	4.2.6 Cultural Resources	4-35
	4.2.7 Land Use	4-36
	4.2.8 Infrastructure	4-36
	4.2.9 Hazardous Materials and Waste	4-39
	4.2.10 Socioeconomics	4-41
	4.2.11 Environmental Justice and other Sensitive Receptors	4-42
4.3	TINKER AIR FORCE BASE	4-45
	4.3.1 Acoustic Environment	4-45
	4.3.2 Air Quality	4-49
	4.3.3 Safety	4-53
	4.3.4 Soils and Water	4-54
	4.3.5 Biological Resources	4-58
	4.3.6 Cultural Resources	4-62
	4.3.7 Land Use	4-63
	4.3.8 Infrastructure	4-63
	4.3.9 Hazardous Materials and Waste	4-66
	4.3.10 Socioeconomics	4-68
	4.3.11 Environmental Justice and other Sensitive Receptors	4-69

TABLE OF CONTENTS (Continued)

<u>CHAPTER</u>		<u>PAGE</u>
4.4	WESTOVER AIR RESERVE BASE	4-73
4.4.1	Acoustic Environment	4-73
4.4.2	Air Quality	4-78
4.4.3	Safety	4-82
4.4.4	Soils and Water	4-83
4.4.5	Biological Resources	4-85
4.4.6	Cultural Resources	4-86
4.4.7	Land Use	4-88
4.4.8	Infrastructure	4-89
4.4.9	Hazardous Materials and Waste	4-91
4.4.10	Socioeconomics	4-93
4.4.11	Environmental Justice and other Sensitive Receptors	4-95
4.5	NO ACTION ALTERNATIVE	4-97
4.5.1	Acoustic Environment	4-97
4.5.2	Air Quality	4-98
4.5.3	Safety	4-98
4.5.4	Soils and Water	4-99
4.5.5	Biological Resources	4-99
4.5.6	Cultural Resources	4-99
4.5.7	Land Use	4-99
4.5.8	Infrastructure	4-99
4.5.9	Hazardous Materials and Waste	4-99
4.5.10	Socioeconomics	4-99
4.5.11	Environmental Justice and other Sensitive Receptors	4-99
5.0	CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	5-1
5.1	GRISSOM AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	5-3
5.1.1	Past, Present, and Reasonably Foreseeable Actions	5-3
5.1.2	Cumulative Effects	5-6
5.1.3	Irreversible and Irretrievable Commitment of Resources	5-8
5.2	SEYMOUR JOHNSON AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	5-9
5.2.1	Past, Present, and Reasonably Foreseeable Actions	5-9
5.2.2	Cumulative Effects	5-13
5.2.3	Irreversible and Irretrievable Commitment of Resources	5-15
5.3	TINKER AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	5-17
5.3.1	Past, Present, and Reasonably Foreseeable Actions	5-17
5.3.2	Cumulative Effects	5-23
5.3.3	Irreversible and Irretrievable Commitment of Resources	5-25

TABLE OF CONTENTS (Continued)

<u>CHAPTER</u>		<u>PAGE</u>
5.4	WESTOVER AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	5-26
5.4.1	Past, Present, and Reasonably Foreseeable Actions	5-26
5.4.2	Cumulative Effects.....	5-29
5.4.3	Irreversible and Irretrievable Commitment of Resources.....	5-31
REFERENCES.....		REF-1
LIST OF PREPARERS.....		PREP-1
LIST OF REPOSITORIES.....		REPOSIT-1
GLOSSARY.....		GLOSS-1
INDEX.....		IDX-1

LIST OF TABLES

<u>NUMBER</u>		<u>PAGE</u>
Table 1-1.	Aircraft Comparison	1-3
Table 1-2.	Scoping Meeting Dates and Locations	1-6
Table 1-3.	Public and Agency Scoping – Summary of Key Issues for Proposed KC-46A MOB 3 Mission.....	1-6
Table 2-1.	Overview of the KC-46A MOB 3 Beddown	2-1
Table 2-2.	Summary of Alternatives	2-8
Table 2-3.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB	2-12
Table 2-4.	Personnel Changes for the KC-46A MOB 3 Mission at Grissom ARB	2-14
Table 2-5.	Baseline Airfield Operations at Grissom ARB	2-15
Table 2-6.	Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Grissom ARB	2-15
Table 2-7.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB	2-18
Table 2-8.	Personnel Changes for the KC-46A MOB 3 Mission at Seymour Johnson AFB	2-20
Table 2-9.	Baseline Airfield Operations at Seymour Johnson AFB	2-21
Table 2-10.	Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Seymour Johnson AFB	2-21
Table 2-11.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB	2-26
Table 2-12.	Personnel Changes for the KC-46A MOB 3 Mission at Tinker AFB	2-28
Table 2-13.	Baseline Airfield Operations at Tinker AFB	2-29
Table 2-14.	Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Tinker AFB	2-29
Table 2-15.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB	2-34
Table 2-16.	Personnel Changes for the KC-46A MOB 3 Mission at Westover ARB	2-35
Table 2-17.	Baseline Airfield Operations at Westover ARB	2-35
Table 2-18.	Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Westover ARB	2-36
Table 2-19.	Comparative Summary of Environmental Consequences	2-39
Table 2-20.	Mitigation Measures to Reduce the Potential for Environmental Impacts	2-46
Table 2-21.	Management Actions to Reduce the Potential for Environmental Impacts	2-49
Table 3-1.	Aircraft Maximum Noise Levels at Grissom ARB	3-2
Table 3-2.	Acres Exposed to Noise Resulting from Baseline Conditions at Grissom ARB	3-4
Table 3-3.	Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Grissom ARB	3-4
Table 3-4.	Annual Emissions for Miami County, Indiana, 2011	3-7
Table 3-5.	Annual Emissions from Existing Operations of the 434 ARW at Grissom ARB, 2015	3-7
Table 3-6.	Federally Listed Species that Could Occur in Cass and Miami Counties, Indiana	3-14
Table 3-7.	Population in the ROI for Grissom ARB	3-21
Table 3-8.	Housing Data in the ROI for Grissom ARB, 2014	3-22

LIST OF TABLES (Continued)

<u>NUMBER</u>		<u>PAGE</u>
Table 3-9.	Aircraft Maximum Noise Levels at Seymour Johnson AFB	3-25
Table 3-10.	Acres Exposed to L_{Adn} Resulting from Baseline Conditions Seymour Johnson AFB	3-27
Table 3-11.	Estimated Off-Base Population Exposed to L_{Adn} Resulting from Baseline Conditions at Seymour Johnson AFB	3-27
Table 3-12.	Estimated Off-Base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions at Seymour Johnson AFB.....	3-28
Table 3-13.	Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Seymour Johnson AFB	3-29
Table 3-14.	Annual Emissions for Wayne County, North Carolina, 2011	3-30
Table 3-15.	Annual Emissions from Existing Operations of the 916 ARW at Seymour Johnson AFB, 2015	3-31
Table 3-16.	Federally Listed Species that Could Occur in Wayne County, North Carolina	3-37
Table 3-17.	Population in the ROI for Seymour Johnson AFB	3-43
Table 3-18.	Housing Data in the ROI for Seymour Johnson AFB, 2014.....	3-44
Table 3-19.	Minority and Low-Income Populations Near Seymour Johnson AFB	3-45
Table 3-20.	Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB	3-47
Table 3-21.	Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB	3-47
Table 3-22.	Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB	3-48
Table 3-23.	Aircraft Maximum Noise Levels at Tinker AFB.....	3-49
Table 3-24.	Acres Exposed to Noise Resulting from Baseline Conditions at Tinker AFB	3-52
Table 3-25.	Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Tinker AFB.....	3-52
Table 3-26.	Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Tinker AFB.....	3-53
Table 3-27.	Annual Emissions for Oklahoma County, Oklahoma, 2011.....	3-54
Table 3-28.	Annual Emissions from Existing Operations of the 507 ARW at Tinker AFB, 2015	3-54
Table 3-29.	Federally Listed Species that Could Occur in Oklahoma County, Oklahoma.....	3-62
Table 3-30.	NRHP-Eligible Buildings at Tinker AFB	3-64
Table 3-31.	Population in the ROI for Tinker AFB	3-70
Table 3-32.	Housing Data in the ROI for Tinker AFB, 2014	3-71
Table 3-33.	Minority and Low-Income Populations Near Tinker AFB.....	3-72
Table 3-34.	Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB.....	3-74
Table 3-35.	Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB	3-74
Table 3-36.	Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB	3-75
Table 3-37.	Aircraft Maximum Noise Levels at Westover ARB.....	3-77

LIST OF TABLES (Continued)

<u>NUMBER</u>		<u>PAGE</u>
Table 3-38.	Acres Exposed to Noise Resulting from Baseline Conditions at Westover ARB	3-78
Table 3-39.	Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Westover ARB.....	3-80
Table 3-40.	Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Westover ARB.....	3-80
Table 3-41.	Annual Emissions for Hampden County, Massachusetts, 2011	3-81
Table 3-42.	Annual Emissions from Existing Operations at Westover ARB, 2015	3-82
Table 3-43.	Federally Listed Species that Could Occur in Hampden County, Massachusetts	3-88
Table 3-44.	Population in the ROI for Westover ARB	3-94
Table 3-45.	Housing Data in the ROI for Westover ARB, 2014	3-95
Table 3-46.	Minority and Low-Income Populations Near Westover ARB.....	3-98
Table 3-47.	Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB.....	3-98
Table 3-48.	Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB	3-98
Table 3-49.	Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB	3-98
Table 4-1.	Aircraft Noise Level Comparison at Grissom ARB	4-2
Table 4-2.	Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Grissom ARB.....	4-4
Table 4-3.	Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Grissom ARB.....	4-5
Table 4-4.	Total Construction Emissions from the Proposed MOB 3 Mission at Grissom ARB.....	4-7
Table 4-5.	Annual Operations Emissions from the Proposed MOB 3 Mission at Grissom ARB, 2019.....	4-8
Table 4-6.	Aircraft Noise Level Comparison at Seymour Johnson AFB.....	4-23
Table 4-7.	Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB	4-24
Table 4-8.	Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB.....	4-26
Table 4-9.	Estimated Off-base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions and the Proposed MOB 3 Mission.....	4-26
Table 4-10.	Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Seymour Johnson AFB	4-27
Table 4-11.	Total Construction Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB	4-29
Table 4-12.	Annual Operations Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB, 2019	4-30
Table 4-13.	Annual Emissions from the Proposed MOB 3 Mission at the Auxiliary Airfield Near Seymour Johnson AFB, 2019.....	4-30
Table 4-14.	Aircraft Noise Level Comparison at Tinker AFB.....	4-45

LIST OF TABLES (Continued)

<u>NUMBER</u>		<u>PAGE</u>
Table 4-15.	Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB	4-48
Table 4-16.	Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB.....	4-48
Table 4-17.	Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Tinker AFB	4-49
Table 4-18.	Total Construction Emissions for the Proposed MOB 3 Mission at Tinker AFB	4-51
Table 4-19.	Annual Operations Emissions from the Proposed MOB 3 Mission at Tinker AFB, 2019	4-52
Table 4-20.	Off-Base Minority and Low-Income Populations in the 65 dB L _{Adn} or Greater ROI (Affected Area), Tinker AFB.....	4-71
Table 4-21.	Off-Base Youth and Elderly Populations in the 65 dB L _{Adn} or Greater ROI (Affected Area), Tinker AFB.....	4-71
Table 4-22.	Aircraft Noise Level Comparison at Westover ARB	4-73
Table 4-23.	Acres Exposed to Noise Resulting from the No Action, the Proposed MOB 3 Mission and Baseline Conditions at Westover ARB	4-75
Table 4-24.	Estimated Off-Base Population Exposed to Noise Resulting from the No Action, Proposed MOB 3 Mission and Baseline Conditions at Westover ARB	4-77
Table 4-25.	Cumulative Aircraft Noise Levels Resulting from the No Action Alternative, the Proposed MOB 3 Mission and Baseline Conditions at Representative Locations Near Westover ARB.....	4-77
Table 4-26.	Total Construction Emissions for the Proposed MOB 3 Mission at Westover ARB	4-80
Table 4-27.	Annual Operations Emissions from the Proposed MOB 3 Mission at Westover ARB, 2019	4-80
Table 5-1.	Past, Present, and Reasonably Foreseeable Actions at Grissom ARB and Associated Region	5-4
Table 5-2.	Summary of Cumulative Effects for Grissom ARB	5-6
Table 5-3.	Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region.....	5-10
Table 5-4.	Summary of Cumulative Effects for Seymour Johnson AFB.....	5-13
Table 5-5.	Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region	5-18
Table 5-6.	Summary of Cumulative Effects for Tinker AFB.....	5-23
Table 5-7.	Past, Present, and Reasonably Foreseeable Actions at Westover ARB and Associated Region	5-27
Table 5-8.	Summary of Cumulative Effects for Westover ARB	5-29

LIST OF FIGURES

<u>NUMBER</u>		<u>PAGE</u>
Figure 2-1.	MOB 3 Alternative Basing Locations.....	2-4
Figure 2-2.	Regional Location of Grissom ARB.....	2-10
Figure 2-3.	Base Overview of Grissom ARB.....	2-11
Figure 2-4.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB.....	2-13
Figure 2-5.	Regional Location of Seymour Johnson AFB.....	2-16
Figure 2-6.	Base Overview of Seymour Johnson AFB.....	2-17
Figure 2-7.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB.....	2-19
Figure 2-8.	Auxiliary Airfield for Seymour Johnson AFB.....	2-22
Figure 2-9.	Regional Location of Tinker AFB.....	2-24
Figure 2-10.	Base Overview of Tinker AFB.....	2-25
Figure 2-11.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB.....	2-27
Figure 2-12.	Regional Location of Westover ARB.....	2-30
Figure 2-13.	Base Overview of Westover ARB.....	2-32
Figure 2-14.	Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB.....	2-33
Figure 3-1.	Baseline Noise Levels (dB L _{Adn}) at Grissom ARB.....	3-3
Figure 3-2.	Grissom ARB Water Resources.....	3-13
Figure 3-3.	Baseline Noise Levels (dB L _{Adn}) at Seymour Johnson AFB.....	3-26
Figure 3-4.	Seymour Johnson AFB Water Resources.....	3-36
Figure 3-5.	Minority and Low-Income Populations Near Seymour Johnson AFB.....	3-46
Figure 3-6.	Baseline Noise Levels (dB L _{Adn}) at Tinker AFB.....	3-51
Figure 3-7.	Tinker AFB Water Resources.....	3-58
Figure 3-8.	Tinker AFB Floodplains.....	3-61
Figure 3-9.	Minority and Low-Income Populations Near Tinker AFB.....	3-73
Figure 3-10.	Baseline Noise Levels (dB L _{Adn}) at Westover ARB.....	3-79
Figure 3-11.	Westover ARB Water Resources.....	3-87
Figure 3-12.	Minority and Low-Income Populations Near Westover ARB.....	3-97
Figure 4-1.	Baseline and Proposed MOB 3 Mission Noise Contours (dB L _{Adn}) at Grissom ARB.....	4-3
Figure 4-2.	Baseline and Proposed MOB 3 Mission Noise Contours (dB L _{Adn}) at Seymour Johnson AFB.....	4-25
Figure 4-3.	Baseline and Proposed MOB 3 Mission Noise Contours (dB L _{Adn}) at Tinker AFB.....	4-47
Figure 4-4.	Floodplains Near the Proposed 507 ARW Ramp at Tinker AFB.....	4-57
Figure 4-5.	No Action, Baseline, and Proposed MOB 3 Mission Noise Contours (dB L _{Adn}) at Westover ARB.....	4-76

VOLUME II – APPENDICES

APPENIDX A*	CORRESPONDENCE
APPENDIX B	DEFINITION OF RESOURCE AND METHODOLOGY FOR ANALYSIS
APPENDIX C	BACKGROUND INFORMATION FOR THE NOISE ANALYSIS
APPENDIX D*	AIR QUALITY BACKGROUND INFORMATION AND EMISSION CALCULATIONS
APPENDIX E	COMMON FLORA AND FAUNA KNOWN TO OCCUR AT EACH ALTERNATIVE BASE
APPENDIX F	BUILDINGS KNOWN TO CONTAIN ASBESTOS, LEAD-BASED PAINT, OR POLYCHLORINATED BIPHENYLS

BACK COVER

*CD-ROM Appendix A and Appendix D are included on CD-ROM on the back cover of this document.

THIS PAGE INTENTIONALLY LEFT BLANK

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
ABW	Air Base Wing
ACM	asbestos-containing material
ACS	American Community Survey
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFE	Aircrew Flight Equipment
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFRC	Air Force Reserve Command
AFSC	Air Force Sustainment Center
AGE	aerospace ground equipment
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
ALC	Air Logistics Complex
AMC	Air Mobility Command
AMDS	Aerospace Medicine Squadron
AME	Alternate Mission Equipment
AMSL	above mean sea level
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
APE	area of potential effect
APZ	accident potential zone
AQD	Air Quality Division
AR	air refueling
ARB	Air Reserve Base
ARW	Air Refueling Wing
AST	aboveground storage tank
ATC	Air Traffic Control
AW	Airlift Wing
AWACS	Airborne Warning and Control System
B-767	Boeing-767
BA	Biological Assessment
BASH	Bird/Wildlife-Aircraft Strike Hazard
bgs	below ground surface
BE	Biological Evaluation
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BOD	biological oxygen demand
BOS	Base Operating Support
BOT	Boom Operator Trainer
C&D	construction and demolition

ACRONYMS AND ABBREVIATIONS (Continued)

C2	Command and Control
CAA	Clean Air Act
CAEP	Committee on Aviation Environmental Protection
CBOD ₅	carbonaceous biochemical oxygen demand
CDC	child development center
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	cubic feet
<i>CFR</i>	<i>Code of Federal Regulations</i>
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
COC	community of comparison
COD	chemical oxygen demand
CONUS	continental United States
CSAF	Chief of Staff of the Air Force
CWA	Clean Water Act
CWPCA	Chicopee Water Pollution Control Authority
CWPP	Comprehensive Watershed Protection Plan
CZ	clear zone
DAQ	Division of Air Quality
dB	decibel(s)
DEQ	Department of Environmental Quality
DFAC	dining facility
DISA	Defense Information Security Agency
DLA	Defense Logistics Agency
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
DVQ	distinguished visiting quarter
DWR	Division of Water Resources
E-coli	Escherichia coli
ECOS	Environmental Conservation Online System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EMS	emergency medical services
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
EPF	Environmental Planning Function
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency

ACRONYMS AND ABBREVIATIONS (Continued)

FFA	Federal Facilities Agreement
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONPA	Finding of No Practicable Alternative
FRP	Facility Response Plan
FTC	Flight Training Center
FTE	full-time equivalent
FTU	Formal Training Unit
FuT	Fuselage Trainer
FW	Fighter Wing
GHG	greenhouse gas
GIS	geographic information system
GMU	groundwater management unit
GMV	government motor vehicle
GPD	gallons per day
GPM	gallons per minute
GWP	global warming potential
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	hazardous air pollutant
HAZMART	Hazardous Materials Pharmacy
HMMP	Hazardous Materials Management Plan
HQ	Headquarters
HQW	High Quality Waters
HUD	U.S. Department of Housing and Urban Development
HWMP	Hazardous Waste Management Plan
I-	Interstate
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IDP	Installation Development Plan
IEMP	Installation Emergency Management Plan
ILS	Instrument Landing System
IMPLAN	Impact Analysis for Planning
IMR	Individual Medical Readiness
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IRP	Installation Restoration Program
JLUS	Joint Land Use Study
K-12	kindergarten through twelve
kV	kilovolt(s)
kVA	kilovolt-ampere
L _{Adn}	A-weighted day-night average sound level
L _{Amax}	A-weighted maximum noise level
LBP	lead-based paint

ACRONYMS AND ABBREVIATIONS (Continued)

LEED	Leadership in Energy and Environmental Design
L _{eq24}	24-hour exposure level
LID	Low Impact Design
LQG	large-quantity generator
LSZ	lower saturated zone
MAJCOM	Major Command
Mass DEP	Massachusetts Department of Environmental Protection
MBTA	Migratory Bird Treaty Act
MCEDA	Miami County Economic Development Authority
Mcf	thousand cubic feet
MDFW	Massachusetts Division of Fisheries and Wildlife
MG	million gallons
mg/L	milligrams per liter
MGD	million gallons per day
MGM	Metro Goldwyn-Mayer
MHC	Massachusetts Historical Commission
MILCON	military construction
MMcf	million cubic feet
MOB 1	First Main Operating Base
MOB 2	Second Main Operating Base
MOB 3	Third Main Operating Base
mph	miles per hour
MSGP	Multi-Sector General Permit
MSW	municipal solid waste
mVA	megavolts-ampere
MW	megawatt
MWh	megawatt hour
MWR	Morale, Welfare, and Recreation
MWS	Major Weapon System
NAAQS	National Ambient Air Quality Standards
NAVAIDS	Airfield Navigational Aid System
NC DEQ	North Carolina Department of Environmental Quality
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NEXRAD	Next Generation Radar
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIPSCO	Northern Indiana Public Service Company
NIPTS	noise-induced permanent threshold shift
NO ₂	nitrogen dioxide
NOI	notice of intent
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSW	Nutrient Sensitive Waters
NVG	night vision goggles

ACRONYMS AND ABBREVIATIONS (Continued)

NVIS	Night Vision Imaging System
O&M	operations and maintenance
O ₃	ozone
OAC	Oklahoma Administrative Code
OAQ	Office of Air Quality
OAS	Oklahoma Archeological Survey
OC-ALC	Oklahoma City Air Logistics Complex
ODEQ	Oklahoma Department of Environmental Quality
ODS	ozone depleting substance
OG&E	Oklahoma Gas and Electric
OHNI	Oklahoma Natural Heritage Inventory
OKESFO	Oklahoma Ecological Services Field Office
OPDES	Oklahoma Pollutant Discharge Elimination System
ORW	Outstanding Resource Waters
OSHA	Occupational Safety and Health Administration
OWQS	Oklahoma Water Quality Standards
OWS	oil-water separator
P2	Pollution Prevention
PAA	Primary Aerospace Vehicles Authorized
PCB	polychlorinated biphenyl
PCS	permanent change of station
PHA	Personal Health Assessment
PM ₁₀	particulate matter less than or equal to 10 micrometers in diameter
PM _{2.5}	particulate matter less than or equal to 2.5 micrometers in diameter
POC	point-of-contact
POV	privately owned vehicle
ppm	parts per million
P-PTT	Pilot Part Task Trainer
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
PZ	producing zone
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
REMC	Rural Electric Membership Cooperative
RISO	Regional Isochronal
ROD	Record of Decision
ROI	region of influence
SAC	Strategic Air Command
SecAF	Secretary of the Air Force
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SOI	Secretary of Interior
SO _x	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasures

ACRONYMS AND ABBREVIATIONS (Continued)

SWP	Stormwater Plan
SWPPP	Storm Water Pollution Prevention Plan
TACAN	Tactical Air Navigation
TCE	trichloroethane
TFI	Total Force Integration
TKN	total Kjeldahl nitrogen
TLF	temporary lodging facility
TMDL	Toxic Maximum Daily Load
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UFC	Unified Facilities Criteria
UMD	Unit Manning Document
U.S. 31	U.S. Highway 31
U.S. 70	U.S. Highway 70
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
<i>USC</i>	<i>United States Code</i>
USDA	U.S. Department of Agriculture
USEIA	U.S. Energy Information Administration
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
USZ	upper saturated zone
UTA	Unit Training Assembly
VOC	volatile organic compound
VQ	visiting quarter
WARP	Wing Air Refueling Pod
WCPS	Wayne County Public School
WST	Weapon System Trainer
WWTP	Wastewater Treatment Plant

CHAPTER 1

PURPOSE AND NEED FOR KC-46A THIRD MAIN OPERATING BASE BEDDOWN



1.0 PURPOSE AND NEED FOR KC-46A THIRD MAIN OPERATING BASE BEDDOWN

The U.S. Congress authorized and appropriated funds supporting the U.S. Air Force's (USAF's) selection of the KC-46A as the newest aerial refueling aircraft to replace a portion of the aging tanker fleet (H.R. 933, the Consolidated and Further Continuing Appropriations Act, 2013, H.R. 3304 - National Defense Authorization Act for Fiscal Year 2014, H.R. 4435 - Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, H.R. 1735 National Defense Authorization Act For Fiscal Year 2016). Beginning in 2010, the deployment of new USAF aircraft and missions must follow Air Force Instruction (AFI) 10-503, "Strategic Basing." Per AFI 10-503, the USAF must perform an enterprise-wide evaluation of Air Force Bases (AFBs) that could be considered as basing locations for the KC-46A. An initial beddown of a Formal Training Unit (FTU) and the First Main Operating Base (MOB 1) occurred at Altus AFB, Oklahoma, and McConnell AFB, Kansas, respectively. The units are led by active duty personnel. Additionally a Second Main Operating Base (MOB 2) beddown, led by the Air National Guard (ANG), occurred at Pease Air National Guard Station, New Hampshire.

This Draft Environmental Impact Statement (EIS) has been prepared to provide the decision maker and the public the information required to understand the future potential impacts of the decisions that may be made regarding beddown of the KC-46A for the Third Main Operating Base (MOB 3) mission.

This Draft EIS analyzes the USAF proposal to beddown the KC-46A MOB 3 mission at USAF installations in the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission. The MOB 3 mission would include the basing of 12 Primary Aerospace Vehicles Authorized (PAA), facilities and infrastructure, and manpower. The first KC-46A aircraft is estimated to arrive at the MOB 3 in 2019 with the transition to be completed by the end of 2020.



The KC-46A will provide decades of aerial refueling support from the Third Main Operating Base (MOB 3).

The USAF used the Strategic Basing Process outlined in AFI 10-503 to identify the preferred and reasonable alternatives for the KC-46A MOB 3 mission, as listed in alphabetical order below:

- Grissom Air Reserve Base (ARB), Indiana
- Seymour Johnson AFB, North Carolina
- Tinker AFB, Oklahoma
- Westover ARB, Massachusetts

Basing actions for the KC-46A mission would follow the 2008 Secretary of Defense Total Force Integration (TFI) policy concept. This policy was enacted into law through the passage of the 2008 National Defense Authorization Act. TFI associations pair two USAF component units (host and associate) together to operate as one. The host unit is assigned responsibility of the physical resources for accomplishing a mission (aircraft, equipment, facilities), and the associate unit shares those resources. Currently, there are three types of TFI associations: classic, active, and Air Reserve Component. The KC-46A MOB 3 mission will utilize an Active Association. Per AFI 90-1001, "Responsibilities for Total Force Integration," an Active Association is when an Air Reserve Component (AFRC or ANG) has principle responsibility for a weapon system it

shares with one or more regular units. Reserve and regular units retain separate organizational structure and chains of command.

The new KC-46A will provide updated technology designed to enhance operations and increase mission effectiveness to support USAF, Navy, Marine Corps, and allies who rely on tanker range and flexibility to strengthen the coalition mission.

Headquarters (HQ) AFRC is the Proponent and lead Major Command (MAJCOM) responsible for the MOB 3 beddown. HQ AFRC will operate the MOB 3 mission with fully trained combat aircrews providing aerial refueling and mission support for regional conflicts, conventional global strike, and nuclear deterrence operations.

1.1 PURPOSE OF THE THIRD MAIN OPERATING BASE BEDDOWN

The purpose of the MOB 3 beddown is to provide a fully capable, combat operational AFRC and Air Mobility Command (AMC) KC-46A air refueling squadron to accomplish aerial refueling and related missions.

The mission-ready KC-46A squadrons will allow immediate and effective employment in exercises, peace-keeping operations, contingencies, and combat. Basing and operating the KC-46A will allow the USAF to maintain combat capability and mission readiness as U.S. military resources become increasingly committed to missions throughout the world.

1.2 NEED FOR THE THIRD MAIN OPERATING BASE BEDDOWN

The KC-46A MOB 3 beddown is needed to support the recapitalization of the USAF's aging refueling aircraft fleet. The USAF needs bases to accomplish the required training and to field a fully operational force. A USAF base for the MOB 3 mission is needed to achieve a high state of operational mission readiness.

1.3 BACKGROUND FOR MEETING THE PURPOSE AND NEED

In April 2006, the USAF completed an Analysis of Alternatives to determine the most appropriate strategy to recapitalize the existing KC-135 aircraft fleet. Based on this analysis, the USAF concluded that a commercial derivative replacement tanker would result in the best value. Although Section 1.4.2 details the technological improvements of the KC-46A, the following points are examples of capabilities that are currently lacking or are very limited with the existing tanker fleet.

- **Receiver Capable.** The ability to receive fuel from other tanker aircraft while in-flight is considered a force multiplier. Currently, this capability is only available on the KC-10 and a small number of KC-135 aircraft. This lack of capability limits persistence over the battlefield and results in inefficient use of aerial refueling assets.
- **Night Vision Imaging System (NVIS).** The fleet lacks a standard NVIS for tanker cockpits and inflight refueling stations. External aircraft lighting is currently not NVIS-compatible. The lack of this capability degrades effectiveness for special operations support and limits the use of these aircraft for covert operations.
- **Multi-point Refueling.** Only a small number of KC-135 aircraft are equipped for simultaneous multi-point refueling. The lack of this capability severely limits the aircraft's functionality to support multiple simultaneous refueling operations, as well as boom and drogue refueling on the same mission.

- **Command and Control (C2) Network.** The KC-135 lacks connectivity to C2 assets, and aircraft have no secure tactical datalink and limited connectivity to other combat support and mobility aircraft.
- **Defensive Protection.** KC-135 aircraft are not normally equipped with aircraft defensive systems, which limit aircrafts from operating in anything but a low-threat environment.

Congressional authority approved funding for a total aircraft inventory of up to 179 KC-46A aircraft by 2028. The KC-46A will modernize the tanker fleet by correcting known current deficiencies, enhancing operations, and increasing mission effectiveness. Most of the total aircraft inventory will be assigned to combat units and would be operated by units assigned to AMC, U.S. Air Force in Europe, Pacific Air Forces, AFRC, and ANG.

1.4 AIRCRAFT CHARACTERISTICS

This section compares the aircraft characteristics of the KC-46A and the existing KC-135. Some key specifications of the KC-135 and the KC-46A are compared in Table 1-1.

Table 1-1. Aircraft Comparison

Specification	KC-135	KC-46A
Length	136 feet, 3 inches	165 feet, 6 inches
Height	41 feet, 8 inches	52 feet, 10 inches
Wingspan	130 feet, 10 inches	156 feet, 1 inch
Power Plant	4 F108-CF-100	2 Pratt & Whitney 4062
Takeoff Thrust	21,634 pounds per engine	62,000 pounds per engine
Speed	530 miles per hour (mph) at 30,000 feet	530 mph at 30,000 feet
Ceiling	50,000 feet	40,100 feet
Maximum Takeoff Weight	322,500 pounds	415,000 pounds
Maximum Fuel Capacity	200,000 pounds	212,000 pounds
Pallets/Palletized Cargo Weight Capacity	6/36,000 pounds	18/65,000 pounds
Crew	3 crewmembers	3 crewmembers
Receiver Fuel Transfer	Very limited	Yes
Fuel Jettison	Yes	Yes
NVIS	No	Yes
Multi-point Refueling	Very limited	Yes
C2 Network	No	Yes
Defensive Protection	Very limited	Yes
Aeromedical Evacuation	Limited	Yes

1.4.1 Aircraft Characteristics of the KC-135

The KC-135 Stratotanker was developed in 1954 as the USAF's first jet-powered refueling tanker to replace the KC-97 Stratotanker and is derived from a Boeing 367-80 commercial passenger plane. Between 1956 and 1966, 820 KC-135 and KC-135 variant aircraft were built. Over the last 50 years, the KC-135 fleet has undergone substantial modifications to add capability. The KC-135 was originally developed to refuel strategic bombers. It was used in the Vietnam War and in all conflicts up to and including Operation Enduring Freedom in Afghanistan. For this Draft EIS, all KC-135 models, including the current R model, are referred to as KC-135. Originally, all KC-135s were equipped with four Pratt & Whitney J-57-P-59W turbojet engines capable of producing approximately 13,000 pounds of thrust each. The current R models were upgraded to use the CFM56-2B1 (Military designation F108-CF-100) turbofan engines, which are capable of generating approximately 21,634 pounds of thrust per engine. The KC-135 has a maximum takeoff weight of more than 322,500 pounds and the ability to off-load in excess of 150,000 pounds of

fuel. In addition, the KC-135 is capable of transporting up to 36,000 pounds of palletized cargo and/or ambulatory patients during aeromedical evacuations. A cargo deck above the refueling system can hold a mixed load of passengers and cargo depending on the fuel storage configuration. The KC-135 pumps fuel through the air refueling boom, but some aircraft have been specially fitted with wing pods to allow a multi-point aerial refueling drogue system. As noted previously, the aircraft is limited by not possessing the capability for receiver fuel transfer, NVIS, defensive protection, or C2 capabilities.

1.4.2 Aircraft Characteristics of the KC-46A

The KC-46A is derived from a commercial Boeing 767-200ER series aircraft and is powered by two Pratt & Whitney 4062 engines (thrust reversers removed). Each engine has the capability to provide approximately 62,000 pounds of thrust. The aircraft will be Federal Aviation Administration (FAA)-certified for worldwide operations. The KC-46A configuration adds the military equipment (e.g., aerial refueling, defensive systems, and situational awareness) and will receive an FAA Supplemental Type Certificate as well as a USAF Military Type Certificate. It is required to meet the FAA Part 36 Stage 4 (most restrictive commercial aircraft noise level standard) and the International Civil Aviation Organization, Committee on Aviation Environmental Protection (CAEP)/6 air contaminant emission limits. Three crewmembers (Pilot, Copilot, and Inflight Refueling Operator) will operate the aircraft with permanent seating for an additional 12 crew members. With new technology and a maximum fuel capacity expected to be 212,000 pounds, the KC-46A is capable of accomplishing all current aerial refueling missions.

The KC-46A will be able to refuel any certified fixed-wing receiver-capable aircraft on any mission both day and night. The aircraft will be equipped with a modernized KC-10 refueling boom integrated with proven fly-by-wire control system and will have the ability to deliver fuel through a centerline hose and drogue system, which adds additional mission capability independent of the boom system.

This aircraft will be capable of accomplishing multi-role missions. By trading fuel for cargo, it will be able to carry up to 18 standard cargo pallets with a total palletized cargo payload of up to 65,000 pounds. With a far greater cargo area contour than the KC-135, KC-46A centerline pallet positions 1 through 8 can be built to carry full height (96-inch-high) cargo without the need for contouring. This is an improvement compared to KC-135 pallets, which are typically restricted to 65-inch-high cargo and must be contoured on the right-hand side starting at 50 inches off the top pallet surface. In normal operations, the KC-46A can be configured to carry 58 passengers and will be capable of providing urgent Aeromedical Evacuation, transporting up to 50 medical patients (24 litters/26 ambulatory).

Additional features include a flush-mounted air refueling receptacle, Wing Air Refueling Pods (WARPs) capability, boom air refueling camera and computer control systems, defensive and communication systems, NVIS/covert lighting, and military radio/navigation receivers. The Inflight Refueling Operator will control the refueling systems from the crew compartment via the Air Refueling Operating Station. A series of cameras mounted on the tanker's fuselage provide a



185-degree field-of-view under day and night lighting conditions. Imaging may be captured in three-dimensional or two-dimensional high-definition video. Fuel is automatically transferred within the aircraft to maintain center of gravity in all axes. The flow of fuel in, out, and within the aircraft can be manually or automatically controlled by the aircraft and can be manually controlled by the aircrew via control display units at the appropriate duty station.

In addition to fuel and cargo transport, each KC-46A aircraft will possess a secure airborne communications capability, which will provide beyond-the-line-of-sight messaging and line-of-sight tactical datalink multi-modal communications via secure networks. Hosting a suite of network-centric communications equipment, the KC-46A will function with most current C2 systems. The KC-46A will also support the C2 core function as a communications “gateway” when equipped with a roll-on gateway system to provide connectivity between tactical network partners in theater.

This aircraft will have self-defense and protection (both active and passive) capabilities and the necessary operational environment awareness to mitigate threats, but will not be operated in areas of high threats without requesting suppression of enemy air defenses and air support.

This aircraft is capable of ferrying fuel into semi-austere airfields. By following Forward Area Refueling Point procedures, the aircraft can off-load fuel into fuel pits, bladders, trucks, or other aircraft, with or without the engines running, without the need for special equipment. The aircraft will be able to operate at certain Night Vision Goggle (NVG) and/or defensive system-required airfields with a minimum of 7,000 feet of paved runway available for takeoff/landing.

The aircraft will be capable of operating in day-night and adverse weather conditions over vast distances to enable deployment, employment, sustainment, and redeployment of U.S., Joint, Allied, and Coalition Forces.

1.5 PUBLIC AND AGENCY INVOLVEMENT

The primary purpose of the Draft EIS is to describe the actions being proposed by the USAF, along with the potential consequences associated with implementation of those actions. The USAF has evaluated all reasonable alternatives to ensure that informed decisions are made after review and consideration of the potential environmental consequences. The Environmental Impact Analysis Process (EIAP) (32 *Code of Federal Regulations [CFR]* 989) is the process by which the USAF implements the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) NEPA implementing regulations. This Draft EIS documents the detailed study of these potential environmental consequences. Compliance with the NEPA process involves several steps to ensure public and agency involvement.

1.5.1 Scoping Process

The public scoping period for the KC-46A MOB 3 EIS began on 23 March 2016 with publication of the Notice of Intent (NOI) in the *Federal Register*. During the following weeks, notification letters were mailed to Federal, state, and local agencies; elected officials; federally recognized tribes (tribes)¹; nongovernmental organizations; and interested individuals as a part of an interagency/intergovernmental coordination process. Through this process, concerned Federal,

¹ Per Department of Defense Instruction (DoDI) 4710.02, *DoD Interactions with Federally-Recognized Tribes*, “tribe” refers to a federally recognized Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges (DoDI 4710.02, Section 3.5). Although not included as federally recognized tribes in the list, we similarly must consult with Native Hawaiian organizations in accordance with DoDI 4710.03.

state, and local agencies are notified and allowed sufficient time to evaluate potential environmental impacts of a proposed action.

Appendix A provides sample notification letters, the notification mailing lists, and the agency comments and concerns received by the USAF during the public scoping period. Newspaper advertisements announcing the intent to prepare an EIS and hold public scoping meetings were published in six different local daily and weekly newspapers. These advertisements were published in the weeks preceding each of the scheduled public scoping meetings.

Four public scoping meetings were held between 12 and 21 April 2016 in communities near the four alternative bases (see Table 1-2). The meetings were held in an open house format where attendees could sign in, if desired, review display boards about the proposed KC-46A MOB 3 mission and provide written comments on the project. During these meetings, USAF personnel presented information on the project through the use of display boards and fact sheets. Comment sheets were available for attendees to provide written comments.

Table 1-2. Scoping Meeting Dates and Locations

Installation	Date	Location	Meeting Time
Westover ARB	12 April 2016	Castle of Knights, 1599 Memorial Dr., Chicopee, MA 01020	5:00 – 8:00 P.M.
Seymour Johnson AFB	14 April 2016	Herman Park Center, 901 East Ash St., Goldsboro, NC 27530	5:00 – 8:00 P.M.
Grissom ARB	19 April 2016	Milestone Event Center, 1458 North Liberator Rd., Peru, IN 46970	5:00 – 8:00 P.M.
Tinker AFB	21 April 2016	Sheraton Midwest City Hotel and Reed Conference Center, 5750 Will Rodgers Rd., Midwest City, OK 73110	5:00 – 8:00 P.M.

The scoping meetings were attended by 142 people, which included residents, elected officials, local business leaders, military affairs committee members, congressional staffers, base employees, and others. The scoping period closed on 25 April 2016, and approximately 50 comments were received. The majority of the comments were supportive of the proposed KC-46A MOB 3 mission, with some commenters expressing concern over noise and others requesting that certain resource area information be presented in the EIS.

Other than the expressions of support, the key issues identified during scoping are summarized in Table 1-3.

Table 1-3. Public and Agency Scoping – Summary of Key Issues for Proposed KC-46A MOB 3 Mission

Issue/Concern/Comment	Base	Concern Expressed by		
		Agency	Public	Tribe
Transportation Resources	Grissom ARB	X		
Requests for additional information	Grissom ARB			X
Biological resources	Grissom ARB, Tinker AFB	X		
Recommendations for compliance with state and Federal regulations	All bases	X		
Manpower	Seymour Johnson AFB		X	
Socioeconomics	Seymour Johnson AFB		X	
Aircraft Noise and Operations	Seymour Johnson AFB, Westover ARB		X	
Request for cultural resource information	Seymour Johnson AFB, Tinker AFB, Westover ARB	X		
Floodplains	All bases	X		
Coast zone consistency	Seymour Johnson AFB	X		

1.5.2 Public and Agency Review

The USAF has released the Draft EIS to the public and agencies for review and comment. Notification of availability was made through the *Federal Register*, newspaper display advertisements, press releases, public service announcements, flyers, and letters accompanying the direct mailing of the Draft EIS document. The Draft EIS document has been posted on a publicly available website at <https://www.KC-46A-Beddown.com>. Copies of the Draft EIS document were sent to Federal, state, and local agencies, tribes, and special interest groups. The document was also sent to citizens or entities that requested a copy and was made available at libraries throughout the region of influence (ROI).

The public comment period will extend for 45 days. All substantive comments received prior to the close of the public comment period will be considered during preparation of the Final EIS. The USAF responds to substantive comments on a Draft EIS in the Final EIS, consistent with 40 *CFR* §1503.4. Substantive comments are regarded as those comments that challenge the analysis, methodologies, or information in the Draft EIS as being factually inaccurate or analytically inadequate; that identify impacts not analyzed or develop and evaluate reasonable alternatives or feasible mitigations not considered by the agency; or that offer specific information that may have a bearing on the decision, such as differences in interpretations of significance, scientific, or technical conclusions. Non-substantive comments, which do not require a USAF response, are generally considered those comments that express a conclusion, an opinion, or a vote for or against the proposal itself, or some aspect of it; that state a position for or against a particular alternative; or that otherwise state a personal preference or opinion.

1.6 TRIBAL CONSULTATION

In an ongoing effort to identify cultural resources or other issues of interest to tribes and as part of the NEPA scoping process, combined notification and Section 106 consultation letters were submitted to tribes (see Appendix A, Section A.3). Response summaries are reflected in Table 1-3 (see Appendix A, Section A.3, for complete responses). Refer to Table A-1 in Appendix A, Section A.3, for a list of the tribes consulted. Following standard USAF practice for formal government-to-government correspondence, consultation was initiated by base Commanders who represent key leadership points of contact. Additional direct communication efforts (phone calls and emails) were made with tribes who did not respond to USAF mailings. Communication with tribes is conducted in accordance with the National Historic Preservation Act (NHPA) Executive Order (EO) 13175 “Consultation and Coordination with Indian Tribal Governments” and Department of Defense Instruction (DoDI) 4710.02.

To support this EIS through the life of the project, the USAF continues to consult on a government-to-government basis with the respective tribes attaching historical, cultural, and/or religious significance to lands or sites in the project areas.

1.7 ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This Draft EIS is designed to analyze the potential environmental impacts associated with the MOB 3 basing of KC-46A aircraft. The beddown will include facilities, personnel, and flight operations analysis at selected bases, but implementation of these actions would occur only at the selected location. The preferred and reasonable alternatives are described in Chapter 2.

Chapter 1 provides information on the purpose and need for the proposed KC-46A MOB 3 beddown. This section includes an overview of the KC-46A capabilities and explains that the

bases identified as preferred and reasonable alternatives for the MOB 3 mission would need to provide facilities, infrastructure, and personnel to assist with KC-46A operations and training. In addition, Chapter 1 addresses public and agency involvement and tribal consultation.

Chapter 2 describes the process for identifying the range of alternatives and explains the USAF proposed action, the preferred alternative for the MOB 3 mission, the reasonable alternatives, and the No Action Alternative. This chapter includes a more detailed explanation of requirements for the MOB 3 beddown in terms of base-specific personnel, facility, and operational elements, and lastly describes the project requirements for each base alternative. This chapter also includes a comparison of the potential environmental consequences across the alternatives, a discussion on mitigation measures, and a discussion on unavoidable impacts.

Chapter 3 is organized by each of the four bases and presents the affected environment at each base selected as an alternative for the proposed MOB 3 mission.

Chapter 4, also organized by base, presents the analysis of potential environmental impacts associated with implementation of the proposed MOB 3 mission. The analysis in this chapter results from overlaying the mission-specific requirements from Chapter 2 upon the affected environment from Chapter 3 to present consideration of the context and intensity to identify the significance of the impacts by resource area.

Chapter 5 identifies past, present, and reasonably foreseeable future projects and describes potential cumulative effects of the proposed beddown in combination with other actions in each region. Chapter 5 also identifies irreversible or irretrievable commitments of resources.

References, contacts made during the EIS development, and a list of the preparers of this EIS are included following Chapter 5.

Appendix A provides sample notification letters, the notification mailing lists, and the agency comments and concerns received by the USAF during the public scoping period. Newspaper advertisements announcing the intent to prepare an EIS and hold public scoping meetings were published in six different local daily and weekly newspapers. These advertisements were published in the weeks preceding each of the scheduled public scoping meetings. Appendix A includes letters of consultation with agencies and government officials.

Appendix B describes the methodology used to evaluate each environmental resource area relative to the environmental consequences of basing KC-46A aircraft for the MOB 3 mission. This appendix also includes the applicable regulations, permits, and appropriate agencies involved in the determination of environmental consequences. The methodology for impact analysis for each resource area, as described in Appendix B, is consistent for each resource area at each of the four bases.

Appendix C includes background information supporting the noise analysis.

Appendix D includes air quality background information for each of the four bases under consideration for the proposed KC-46A MOB 3 beddown. This background information includes regional climate information, along with the spreadsheets used to complete the air quality analysis contained in Chapter 4.

Appendix E contains partial lists of common flora and fauna known to occur at each alternative base.

Appendix F summarizes the buildings that would be affected by the proposed KC-46A MOB 3 beddown-related demolition, renovation, or alteration; their years of construction; and their potential to contain toxic substances (asbestos-containing material [ACM], lead-based paint [LBP], and polychlorinated biphenyls [PCBs]).

CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES



2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW

This section presents a description of the activities and implementing actions associated with the KC-46A Third Main Operating Base (MOB 3) mission. The MOB 3 mission involves the basing of 12 KC-46A aircraft in one squadron at a U.S. Air Force (USAF) installation within the continental United States (CONUS) where the Air Force Reserve Command (AFRC) leads a Mobility Air Force mission.

The squadron of KC-46A aircraft will require infrastructure, facilities, airfield operations, training activities, personnel, and airspace to support missions. This section identifies the operational requirements that would be involved at any of the alternative bases.

Table 2-1 provides an overview of key elements associated with the KC-46A MOB 3 beddown that have the potential to affect environmental resources at the base or under the regional training airspace.

Table 2-1. Overview of the KC-46A MOB 3 Beddown

The proposed MOB 3 beddown involves implementing several related elements at a selected base.

Elements Affecting the Base

- ✓ The beddown of 12 KC-46A aircraft in one squadron in accordance with the aircraft delivery schedule
- ✓ Depending on mission profiles, conduct sorties at each base for pilot, copilot, and inflight refueling operator training/certification, aerial refueling operations, and global reach missions
- ✓ Renovate, construct, and manage facilities and infrastructure necessary to support the mission
- ✓ Implement personnel changes (increases or decreases) at the base to conform to mission requirements

Depending on the base, the proposed action would either add to current missions or replace the existing KC-135 mission. Implementation of the proposed action would occur in two stages: a beddown stage and an operational stage. The beddown stage involves construction/retrofit of required facilities, infrastructure, and prepared surfaces, which includes renovation, alteration, new construction, and demolition. The beddown stage also includes preparing support facilities for new personnel to support the mission. The operational stage involves conducting the day-to-day activities (operational missions, maintenance, etc.) of the squadron at the base, including base flight operations, and training in the regional airspace.

Section 2.5 provides a detailed description of each of the alternative bases under consideration. The description of each alternative carried forward as a reasonable alternative contains specifics about how the beddown and mission would be implemented at each base and within the regional airspace. In accordance with the Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations [CFR]* 1502.14[d]), Section 2.6 describes a No Action Alternative, which consists of not bedding down a KC-46A MOB 3 mission.

2.2 NARROWING PROCESS FOR ALTERNATIVE BASES

The narrowing process used to identify alternatives for the KC-46A MOB 3 basing location is described below. The process applied operational and other selection criteria to identify reasonable alternatives for the beddown of the KC-46A MOB 3 mission.

2.2.1 Alternative Identification Process Methodology

This section describes the USAF Strategic Basing Process, and then describes how the Strategic Basing Process is applied to identify the KC-46A MOB 3 basing locations included in this Draft Environmental Impact Statement (EIS).

In general, the USAF uses the Strategic Basing Process outlined in Air Force Instruction (AFI) 10-503 to select locations to beddown USAF missions. The process begins by identifying all the USAF installations that could reasonably support a given mission based on a few broad requirements. This enterprise of bases is then evaluated using Secretary of the Air Force (SecAF)-approved objective criteria to screen for a list of top candidate bases. Major Command (MAJCOM)-led site surveys are then conducted at each of the top candidate bases to determine if the base could reasonably support the mission in question. The Strategic Basing Executive Steering Group oversees the process and reports findings directly to the SecAF and Chief of Staff of the Air Force (CSAF). This process was mandated by the SecAF to ensure basing decisions were made using a deliberate, repeatable, and standardized process.

In September 2011, Air Mobility Command (AMC) presented the Lead Command Intent for the KC-46A to the SecAF. This Lead Command Intent described the proposed basing action tenets, force structure mix (Active Duty, Reserve, and Air National Guard [ANG] personnel), basing timelines, and the critical information that would be used to shape and inform decisions made throughout the USAF Strategic Basing Process. The following planning conventions were derived from the Lead Command Intent:

1. Identify the number of KC-46A aircraft scheduled to be delivered by 2019. This time period corresponded to the U.S. Department of Defense (DoD) Future Years Defense Program, which is the program and financial plan approved by the Secretary of Defense, and provides a basis for USAF planning. Planning beyond this time period is speculative due to the indeterminacy of resource availability.
2. Identify the number of KC-46A aircraft to be allocated to training and to operations based on then-current national strategic considerations.
3. Determine the number of bases minimally needed to support receipt of these aircraft for training and operations by dividing the amount allocated to training and to operations by the number of squadrons based on one squadron configuration of 12 Primary Aerospace Vehicles Authorized (PAA). PAA are those aircraft assigned to meet the primary aircraft authorization and reflect the number of aircraft flown by a unit in performance of its mission.
4. Recognize additional factors of Plans and Guidance and Global Positioning, which include strategic considerations but do not provide meaningful distinction among bases for USAF training within the United States and its territories. An additional Logistics Supportability factor equates to Boeing's support capacity set forth in its contract with the USAF. This factor does not distinguish among bases and is not included in the identification of reasonable MOB 3 beddown alternatives.

Consideration of the aforementioned planning conventions led to an initial screening of all USAF installations against the following standards for the MOB 3 mission: (1) a runway of at least 7,000 feet in length; (2) the presence of an AFRC wing that led a Global Mobility mission and owned the aircraft; and (3) a CONUS location. The initial screening yielded a defined enterprise of 18 bases to be evaluated for the MOB 3 beddown.

In 2012, AMC presented objective screening criteria to the SecAF for approval. The 2012 approved screening criteria were the same criteria used to score the MOB 3 enterprise list of 18 bases to identify those bases that could best support the KC-46A MOB 3 mission. The scoring criteria were divided into four major categories: Mission, Capacity, Environmental, and Cost. These categories and their sub-categories are described in further detail as follows:

- Mission criteria: Proximity to refueling demand; airfield and airspace availability; fuels dispensing capability; fuels storage; fuels receipt; and the potential to establish an association (Active Association)
- Capacity criteria: Hangar capacity; runway (length and bearing capacity); ramp space; Base Operating Support (BOS) capacity; Squadron Operations and Aircraft Maintenance Units (AMUs); Flight Training Center (simulators); Fuselage Trainer (FuT); and communications infrastructure
- Environmental criteria: Air quality (meet Clean Air Act [CAA] attainment status); environment impact (known environmental issues, such as wetlands, endangered species, etc.); noise (compatibility); encroachment (clear zone [CZ] and accident potential zone [APZ] considerations); and land use (local community's adoption of zoning or other land use controls to reduce encroachment and preserve the base's flying operations)
- Cost criteria: Favorable area construction factor based on the DoD Facilities Pricing Guide, dated June 2007 (DoD 2007), as updated by the June 2009 draft Office of the Secretary of Defense Pricing Guide (DoD 2009); and favorable area locality cost factors

The SecAF considered the objective screening results, as well as subjective operational factors, in determining the candidate bases for the KC-46A MOB 3 mission. The subjective operational factors, also known as military judgment factors, included the following:

- Plans and Guidance
- Global and Regional Coverage
- Combatant Commander Support
- Total Force
- Beddown Timing
- Force Structure
- Training Requirements and Efficiencies
- Logistic Supportability
- Resources/Budgeting

The Strategic Basing Process described above resulted in the identification of four alternative bases for the MOB 3 mission (see Figure 2-1).

- Grissom Air Reserve Base (ARB), Indiana
- Seymour Johnson Air Force Base (AFB), North Carolina
- Tinker AFB, Oklahoma
- Westover ARB, Massachusetts



Figure 2-1. MOB 3 Alternative Basing Locations

2.3 KC-46A MISSION-SPECIFIC REQUIREMENTS

The objective criteria described above specify the general requirements for the MOB 3 mission. This section describes the specific details and requirements of the mission. Various factors influence the siting of facilities within a developed cantonment area. These factors involve operational functionality, safety, and compliance with regulations and policies (Federal, state, or local). The process of planning the beddown for a new aircraft and mission considers facility requirements that can be partially or wholly fulfilled by existing facilities on the base. The siting process for new construction is iterative, applying factors described below to identify suitable sites relative to existing space and facilities that provide a reasonable operational efficiency/cost-benefit value. All construction contracts would require the use of Unified Facilities Criteria (UFC) 3-101-01-*Architecture* and attainment of a Leadership in Energy and Environmental Design (LEED) certificate level of silver. Construction and renovation projects within the 65 decibel (dB) noise contour would include acoustical design considerations for façade elements and interior design requirements per UFC 3-101-01. Land use should comply with AFI 32-7063, “AICUZ Program” (December 2015).

As part of the process described above, bases were evaluated based on their ability to: (1) provide basic infrastructure and (2) meet the physical mission requirements with existing infrastructure and facilities (with minor renovation or additions and alterations). For this beddown, the USAF intends to use as many existing facilities as possible, but recognizes that some new facilities would be required.

In addition to the infrastructure requirements, the manpower requirements for each base are different due to the process in which manpower is determined for each unique Major Weapon System (MWS) and its associated mission. In addition, the current mission and organization at each base are factors

in determining the magnitude of manpower changes. These considerations include whether or not there is an Active Association already supporting the current mission, and whether the KC-46A mission would be added to the existing installation missions or replace an existing tanker mission.

2.3.1 KC-46A MOB 3 Mission-Specific Requirements

The basic requirements for the KC-46A MOB 3 beddown include the physical infrastructure, land, airspace, personnel, and water and energy assets needed to support the MOB 3 mission. This section presents the criteria that apply to the MOB 3 siting, facilities for mission and mission support functions, and personnel authorized to execute work related to the mission and flying operations required as part of the MOB 3 mission.

2.3.1.1 MOB 3 Facility and Infrastructure Requirements

The basic allocation and physical requirements necessary to support one squadron of 12 KC-46A aircraft are listed below.

- General Maintenance Hangar
- Fuel Cell Hangar
- Corrosion Control/Wash Rack Hangar
- Squadron Operation Facilities
- Aircraft Maintenance Unit (AMU) Facility
- Flight Training Center (FTC) consisting of:
 - Weapon System Trainer (WST)
 - Boom Operator Trainer (BOT)
 - Pilot Part Task Trainer (P-PTT)
- Fuselage Trainer (FuT)
- Supply Warehousing, Flightline Support Facility and Aircraft Parts Storage
- Aerospace Ground Equipment (AGE) storage and parking
- Cargo Deployment Function, Passenger Deployment Function, and Small Terminal Ops Function for a unit organic deployment capability
- Crash Recovery Shop with adequate vehicle parking
- Alternate Mission Equipment (AME) Storage and Maintenance Facility (pallets, etc.)
- Parking ramp with eight AMC generic aircraft sized parking spots equipped with Fuel Pits and a Type III Fuel Hydrant System
- Appropriate fuel supply, storage, and distribution systems to support 12 PAA
- Radar Approach Control (RAPCON), Instrument Landing System (ILS), Tactical Air Navigation (TACAN), and Airfield Navigational Aid System (NAVAIDS) that can support the KC-46A
- Vehicle Operation Administration and Maintenance Shop
- Aircrew Flight Equipment (AFE) Facility
- A variety of shop areas (welding, hydraulics, composite repair, sheet metal, etc.)

Depending on the location, a variety of other service-type facilities and infrastructure could be required to support the MOB 3 mission. These could include a child development center (CDC), utilities, roads, taxiways, overruns, dining facilities, a fitness center, visiting quarters, and dormitories.

Hangars, Aircraft Maintenance Units (AMUs), Squadron Operations. Two dedicated full-in maintenance hangars are required in accordance with SecAF/CSAF-approved Strategic Basing Criteria and Air Force Manual (AFMAN) 32-1084, “Facility Requirements,” para 3.1.2 and Table 3.1; using the KC-135 planning factor of 0.15. The two hangars must be capable of supporting all maintenance activities, including general and fuel cell maintenance, along with corrosion control/wash rack capabilities.

The MOB 3 mission will also require a Squadron Operations facility and an AMU. The AMU space serves as a home base for technicians working on the flightline and also houses the administrative functions for the flightline. All facilities would be designed based on the Total Force Integration (TFI) concept.

Flightline Development. To support the MOB 3 mission, a 7,000-foot-long, 147-foot-wide runway (minimum) capable of handling aircraft with a takeoff weight of 415,000 pounds is needed. The 12 PAA would require eight parking spots capable of supporting the KC-46A plus additional space for taxiways; all new construction required will be sized to accommodate AMC generic aircraft requirements, plus additional space for taxiways. In addition, the MOB 3 mission would require an available and functioning RAPCON, ILS, TACAN, and NAVAIDS capable of supporting day and night landings. The flightline would also require an Intrusion Detection and Surveillance System capable of supporting the additional aircraft.

Fuels Infrastructure. To support the MOB 3 mission, the base must be able to receive at least 120,000 gallons of jet fuel per day from commercial sources to maintain adequate supply. Fuel storage at the selected base would include storage facilities with more than 600,000 gallons of capacity and would be able to dispense at least 120,000 gallons of fuel per day through a Type III hydrant system.

Flight Training Center (FTC) and Fuselage Trainer (FuT). New aircraft like the KC-46A require a flight training center with a combination of full system trainers, part task trainers, simulators, classroom space, instructor accommodations/staff, and administrative space/staff to receive and train aircrews. Formal training involves classroom work; computer-based training; part task trainer sessions; WST and BOT training sessions; and FuT training sessions. All cargo operations training would be performed in the FuT or in a parked aircraft.

The FTC requires bays for the WST, BOT, one P-PTT, an adjoined or adjacent classroom, and office space. The FuT requires administrative and academic space, one open bay, and one cargo yard adjacent to the flightline.

Housing and Support Facilities. Housing for eligible permanent-party military personnel associated with the MOB 3 mission would include privatized base housing or housing available in the local market off base. For the MOB 3 mission, where possible, dormitories would be used for all unaccompanied enlisted Airmen and for permanently assigned, unmarried first-term Airmen. Because AFRC bases do not have dormitories, community housing would also be evaluated. Adequate child care, medical facilities, a fitness center, and other BOS/force support must also be available.

2.3.1.2 MOB 3 Personnel Requirements

Basing of the KC-46A MOB 3 mission would require sufficient personnel to operate and maintain the aircraft and to provide necessary support services. Depending on the location and the current mission, the anticipated increase in full time personnel would range from 53 to 411. This would include active-duty and AFRC officer, enlisted, DoD civilian, contractor support

personnel, and BOS personnel. In addition to the personnel required to support the mission, the dependents or family members of non-contractor, full-time personnel are also included in the analysis. Family members and dependents were estimated at 2.5 times 65 percent of the full-time personnel, excluding contractors. School-age dependents of full-time personnel were estimated at 1.5 times 65 percent of full-time personnel, excluding contractors.

2.3.1.3 MOB 3 Flight Operations

KC-46A aircrews associated with the MOB 3 mission would complete mission sorties in support of real-world objectives and training sorties to maintain proficiency in the aircraft. The majority of training would occur in flight simulators. For those tasks that require in-flight training, a typical training sortie is described below.

A typical KC-46A training sortie would be similar to a KC-135 training sortie and would include a takeoff from the home base; climb to altitude for training on a designated Aerial Refueling (AR) route; practice approaches at either the home base or another suitable location chosen by the aircrew; and then accomplish a final landing at the home base. Training sorties typically depart from and return to the home base on the same day.

*A **sortie** consists of a single military aircraft flight from the initial takeoff through the final landing and includes all activities that occur during that flight. An **operation** is an event, such as a landing or takeoff that occurs during the flight. A single sortie includes at least two operations – an initial takeoff and final landing – and may include additional operations conducted as part of additional practice approaches. Aircraft performing additional practice approaches conduct one operation during the landing portion and another operation as they depart the airfield to line up for the next approach.*

Mission sorties occur during any hour of any day as needed to meet the requirements of the missions they support. In the airfield environment, these sorties follow the same procedures followed during a training mission, but returning flights conduct additional practice approaches much less frequently than returning training sorties. Mission sorties include but are not limited to transits to and from deployments.

KC-46A operations would, for the most part, follow the same flight procedures currently used by AFRC aircraft while operating near each alternative location. The capabilities of KC-46A aircraft would result in certain existing procedures being accomplished differently. For example, aircraft climb-out can be accomplished more quickly in a KC-46A than in a KC-135 because the ratio of thrust to aircraft weight is higher in a KC-46A.

Tactical flight procedures, which are only rarely conducted by KC-135 aircraft, would comprise 3 percent of total KC-46A flying operations. Tactical approaches and departures are designed to minimize aircraft exposure to ground-based threats. These procedures could involve approaching the airfield from randomly-selected directions at low altitudes or climbing away from an airfield following a tight spiral pattern that remains over the installation. KC-46A aircrews would practice tactical procedures primarily in flight simulators, minimizing the number of actual tactical flying operations.

Any operations that occur between the hours of 10:00 P.M. and 7:00 A.M. local time are classified as occurring in acoustic night. Operations during this late-night time period are sometimes necessary to accomplish real-world missions and to meet night operation training requirements. Operations during acoustic night would comprise no more than 11 percent of total operations.

The days of the week on which KC-46A operations would occur would follow patterns set by ongoing AFRC unit operations. Training sorties would be conducted during weekdays and on

Reserve duty weekends. Mission sorties are scheduled based on real-world events and would be conducted on any day of the year.

2.3.1.4 MOB 3 Airspace Use

The KC-46A would be operated in existing airspace, and the types of flight operations would mirror existing KC-135 operations, when applicable. KC-46A aircrews would use existing AR routes and fuel jettison areas, when applicable. AR routes are classified by the Federal Aviation Administration (FAA) as Airspace for Special Use. Like the KC-135, the KC-46A would not require designated military airspace other than existing AR routes.

2.4 PREFERRED AND REASONABLE ALTERNATIVES

In early 2015, AFRC and AMC conducted detailed, on-the-ground site surveys at each of the four alternative bases, with each base evaluated against operational requirements, potential impacts to existing missions, housing, infrastructure, and manpower. Additionally, cost estimates to bed down the KC-46A at each of the candidate bases were developed.

As part of the Strategic Basing Process, all of this information was evaluated and presented to the SecAF and the CSAF. Based on operational analysis, results of the site surveys and military judgment factors, the USAF identified Seymour Johnson AFB as the preferred alternative with Grissom ARB, Tinker AFB and Westover ARB as reasonable alternatives. Along with the No Action Alternative, all four bases will be evaluated as alternatives in this EIS.

2.5 DESCRIPTION OF ALTERNATIVE BASING LOCATIONS

Depending on infrastructure, facilities, and, to some degree, personnel, available for the KC-46A MOB 3 mission, proposed construction, demolition, renovations, and incoming personnel numbers vary between alternatives. The facility siting analysis for each base considered the functional mission requirements and compared them with the existing infrastructure and environmental constraints at each base. The following subsections provide specifics about the beddown and operations at each of the four bases in alphabetical order. Table 2-2 provides a summary comparison of the alternatives, along with the No Action Alternative.

Table 2-2. Summary of Alternatives

Alternative Components	Grissom ARB ^a	Seymour Johnson AFB ^a	Tinker AFB ^a	Westover ARB	No Action Alternative
Current KC-135 PAA	16	16	8	0	Varies by location
Proposed KC-46A PAA	+12	+12	+12	+12	0
Facilities and Infrastructure	See Section 2.3.1				None
Full-Time Personnel Change	+217	+53	+308	+411	0
Aircraft Operations Change	-1,490	+1,746	+4,041	+7,032	0

^a Denotes KC-135 replacement mission.

Note: “+” indicates an increase and “-” indicates a decrease.

2.5.1 Grissom Air Reserve Base, Indiana

The USAF is considering Grissom ARB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations that would occur with implementation of the MOB 3 mission.

2.5.1.1 Grissom ARB Overview

Grissom ARB is located in north-central Indiana, approximately 70 miles north of Indianapolis (see Figure 2-2). The base covers an area of approximately 1,312 acres. A single, 12,500-foot-by-200-foot, joint use runway (Runway 05/23) is located at the base. The joint use nature of the runway allows it to be used by both civilian-owned and military aircraft. The overall layout of existing facilities and infrastructure at Grissom ARB is shown on Figure 2-3.

Originally named Bunker Hill Naval Air Station, the base was opened in 1942 as a training base for Navy, Marine, and Coast Guard pilots. In 1942 the base encompassed 2,722 acres. The base closed after World War II. In 1954, the base was reopened as Bunker Hill AFB and assigned to the Tactical Air Command. In 1968, the base name was changed to Grissom AFB. As a result of the Defense Base Closure and Realignment Act of 1990, Grissom AFB was realigned in 1994; AFRC retained 1,312 acres as a cantonment area, designated as Grissom ARB. Today the base is home to 434th Air Refueling Wing (ARW) as the host unit. The 434 ARW is one of the largest KC-135 missions in the AFRC, with a mission to develop and maintain the operational capability of its units and train reservists for worldwide duty. In addition to the large USAF presence, Grissom ARB is also home to units from the U.S. Army Reserve and U.S. Marine Corp Reserve.

2.5.1.2 MOB 3 Beddown Specifics

The USAF determined that Grissom ARB's infrastructure and base resources could accommodate the basic requirements of the KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2. This section details the actions that would occur at Grissom ARB if the base were selected for the KC-46A MOB 3 mission. The MOB 3 mission would be a replacement mission for the existing KC-135 mission at Grissom ARB. The first replacement aircraft is estimated to arrive in 2019. The current aircraft inventory at Grissom ARB includes 16 KC-135 aircraft.

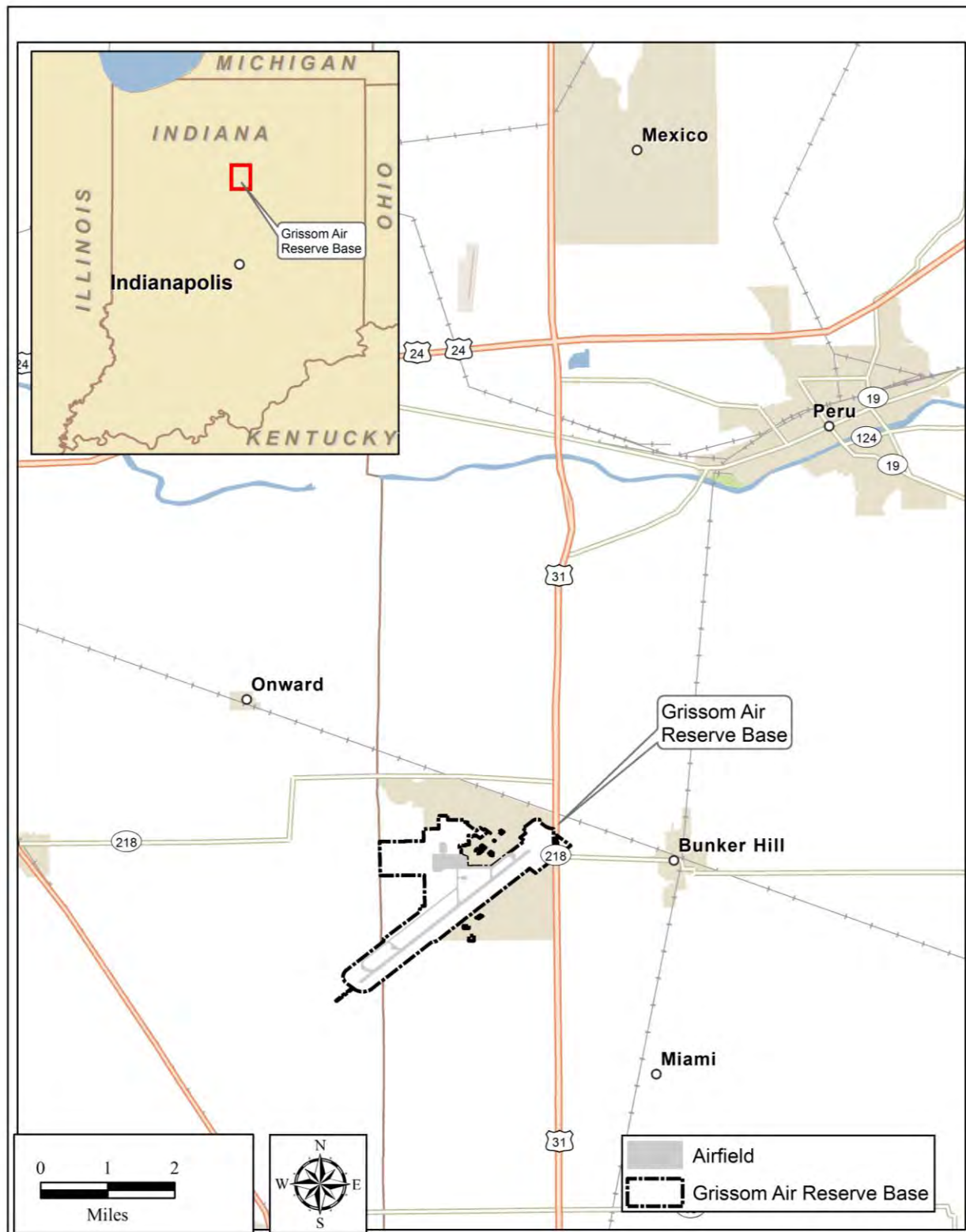


Figure 2-2. Regional Location of Grissom ARB

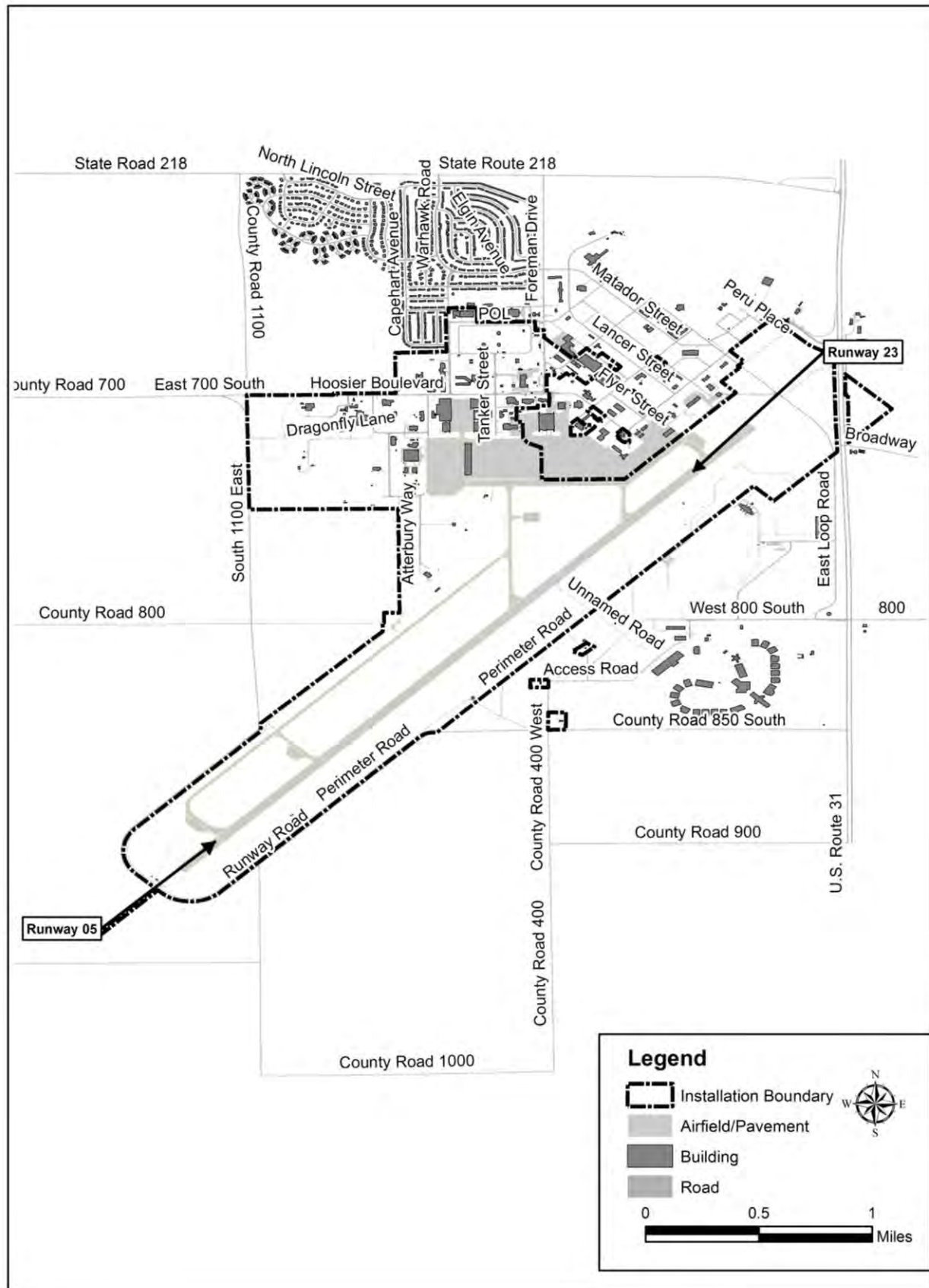


Figure 2-3. Base Overview of Grissom ARB

2.5.1.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Most of these requirements are met through existing infrastructure. However, the proposed MOB 3 beddown at Grissom ARB would require new construction and demolition (C&D) of facilities, as well as modifications to some existing facilities. The projects that would be necessary to support the KC-46A MOB 3 mission at Grissom ARB are listed in Table 2-3.

Table 2-3. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB

Project	Facility Size (square feet)
Demolition	
Building 437 (Hangar 5)	31,142
Building 438 (Hangar 3)	29,471
Total Square Feet	60,613
Renovation	
Building 209, Logistics Readiness Squadron (Internal fencing and vault)	7,244
Building 426, Wing Air Refueling Pod (WARP) storage and maintenance	2,423
Building 434, (Hangar 6) FuT	36,285
Building 436, (Hangar 2) AME	28,686
Building 439, (Hangar 1) Maintenance/Various Shops	12,971
Building 453, Composite Maintenance Shop	9,731
Building 473, Renovate Lodging (convert rooms into first-term Airmen/Single Airman Quarters)	28,579
Building 663, Squadron Operations	25,973
Building 668, Flight Simulators (WST/BOT)	13,154
Relocation of two portable sheds (PB-56 and unnamed)	100
New pavement parking ramp	15,000
Total Square Feet	180,146
New Construction	
2-Bay Hangar (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	157,358
Building 563, Fitness Center	26,242
Total Square Feet	183,600

One new two-bay hangar would be constructed along the existing flightline to support the KC-46A MOB 3 mission at Grissom ARB. Construction of this facility would require the demolition of Buildings 437 and 438. New construction would also be required for an expansion to the fitness center. Renovations would be required in nine buildings (209, 426, 434, 436, 439, 453, 473, 663, and 668). Two small, portable sheds would be relocated, and an area of pavement within the aircraft parking ramp would be upgraded (Figure 2-4). Building 670 is currently funded for renovations which would occur with or without the KC-46A MOB 3 beddown. Should the MOB 3 beddown occur, the building would be used for maintenance supply. Three additional buildings would be used by the KC-46A MOB 3 mission, but no changes to those buildings would occur. Building 7075 would be used for Aerial Port Squadron, Airlift Control Element, AME, and potable water truck parking. Buildings 1610 and 7087 would be used by KC-46A personnel and as additional storage space.

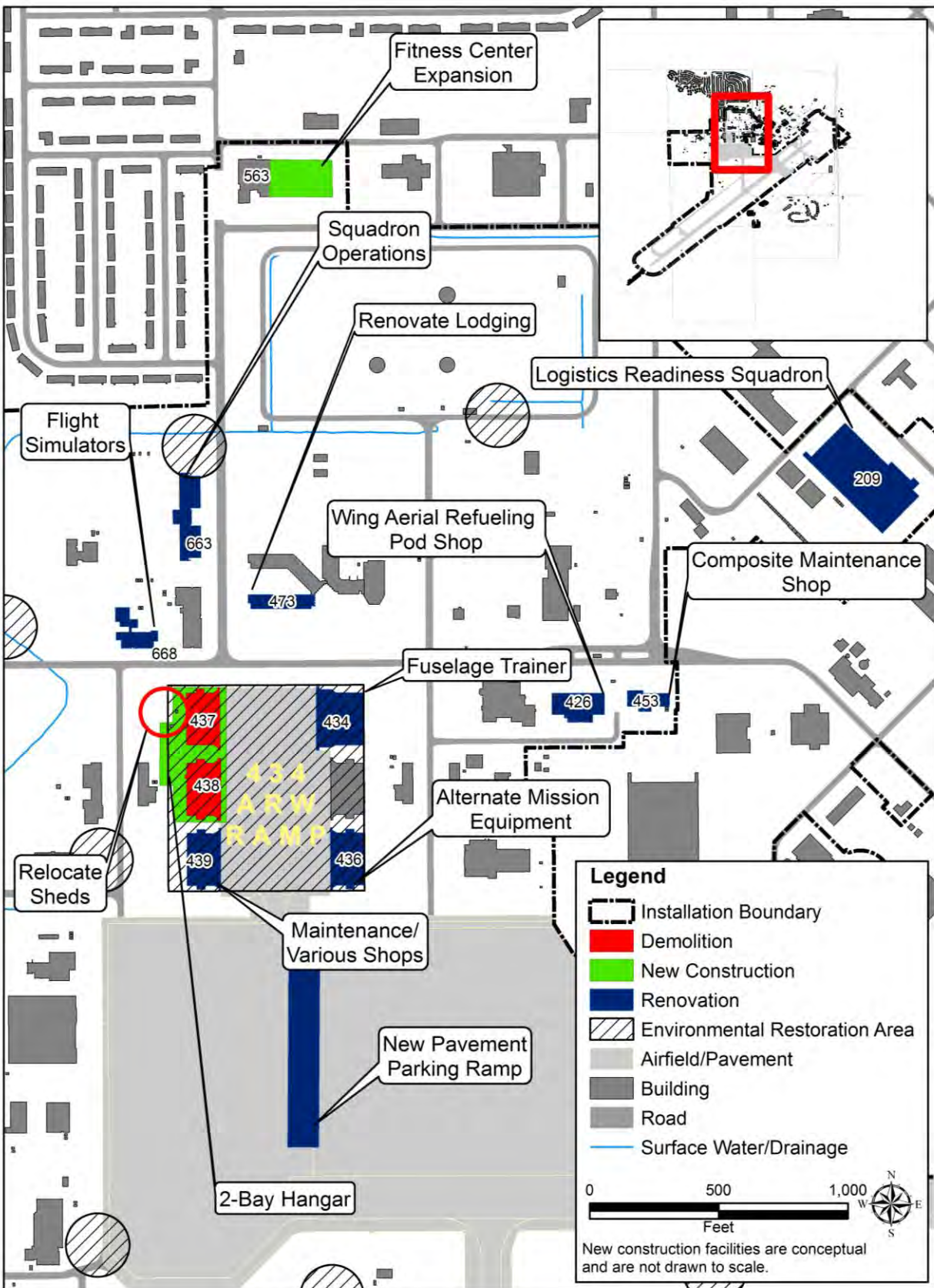


Figure 2-4. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Grissom ARB

Although a military dining facility is located on Grissom ARB, it is only operational during Unit Training Assembly (UTA) weekends due to Traditional Reservists only operating this facility during drill weekends. Therefore, personnel associated with the proposed KC-46A MOB 3 mission would utilize commercial dining facilities outside of Grissom ARB. Also, childcare is not available on Grissom ARB. The EIS will assume that childcare will not be available on the installation.

2.5.1.2.2 Personnel

The 434 ARW at Grissom ARB is authorized 1,605 personnel: 47 military, 246 DoD Civilians and 1,312 part-time Reservists (Table 2-4). Currently, the base has approximately 1,715 personnel, which includes 110 contractors in addition to the 1,605 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-4. Personnel Changes for the KC-46A MOB 3 Mission at Grissom ARB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	47	0	47
Dual Status Technician (Reserve, civilians, Federal)	305	+45	350
Non-Dual Status (DoD civilians)	246	-2	244
Contractors ^a	110	+15	125
Subtotal	708	+217	925
Part Time			
Drill Status Reservists	1,312	-117	1,195
Total Personnel Authorizations^b	2,020	+100	2,120
Total Personnel on Base^c	1,715	+55	1,770

^a Contractors are not authorized on the Unit Manning Document (UMD). They are categorized as "other base personnel."

^b Some personnel work off-site but are assigned to the unit.

^c Total personnel supporting the 434 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Grissom ARB would result in a net increase of 55 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 972 dependents currently associated with the non-contractor, full-time personnel at Grissom ARB live in communities surrounding the installation. Approximately 328 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.1.2.3 Aircraft Operations

The 434 ARW currently flies 1,100 sorties per year (Table 2-5) and an average of three additional practice approaches per sortie, for a total of 8,800 annual airfield operations. Approximately 19 percent of total operations are currently flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). A variety of different military transient aircraft (including A-10, C-130, C-17, C-5, F-18, CH-46 and UH-60 aircraft) conduct operations at Grissom ARB. Of the 2,450 transient aircraft operations per year, 11 percent are conducted during acoustic night. The majority of the annual 4,618 civilian aircraft operations are conducted by general aviation aircraft, and only 2 percent of these operations are conducted during acoustic night.

Table 2-5. Baseline Airfield Operations at Grissom ARB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-135	1,100	0	858	242	5,148	1,452	7,106	1,694	8,800
Transient	879	132	879	132	428	0	2,186	264	2,450
Civilian	2,263	46	2,263	46	0	0	4,526	92	4,618
Total	4,242	178	4,000	420	5,576	1,452	13,818	2,050	15,868

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern. Data are based on information provided by the 434 ARW.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

After the aircraft beddown, KC-46A aircrews associated with the MOB 3 mission would fly approximately 1,219 annual sorties and an average of four additional practice approaches per sortie, for a total of 7,310 airfield operations per year (Table 2-6). The 17 percent net decrease in tanker operations does not directly correspond to the 25 percent decrease in PAA (from 16 KC-135 aircraft to 12 KC-46A aircraft), because each KC-46A aircraft would be flown more frequently than the KC-135 aircraft are currently being flown. Approximately 5 percent of KC-46A operations would occur during acoustic night. Grissom ARB-based KC-46A aircrews would occasionally conduct practice approaches at other airfields according to aircrew preference and training requirements. No single airfield other than Grissom ARB would be used by the KC-46A on more than an occasional basis.

Table 2-6. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Grissom ARB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-46A	1,219	0	1,097	122	4,628	244	6,944	366	7,310 ^c
Transient	879	132	879	132	428	0	2,186	264	2,450
Civilian	2,263	46	2,263	46	0	0	4,526	92	4,618
Total	4,361	178	4,239	300	5,056	244	13,656	722	14,378

^a An operation is the accomplishment of a single maneuver such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

^c The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.5.2 Seymour Johnson Air Force Base, North Carolina

The USAF has identified Seymour Johnson AFB as the preferred alternative for the MOB 3 mission of 12 KC-46A aircraft. The 12 KC-46A aircraft would replace the 16 KC-135 aircraft currently located at Seymour Johnson AFB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations that would occur with implementation of the MOB 3 mission.

2.5.2.1 Seymour Johnson AFB Overview

Seymour Johnson AFB is located in Wayne County, North Carolina, within the city limits of Goldsboro (see Figure 2-5). The 3,233-acre installation hosts one east-to-west runway (Runway 08/26) that is 11,758 feet long by 300 feet wide. The overall layout of existing facilities and infrastructure at Seymour Johnson AFB is shown on Figure 2-6. The host unit at Seymour Johnson AFB is the 4th Fighter Wing (FW) which flies the F-15E fighter. A second flying wing (916 ARW) under the command of AFRC is stationed at Seymour Johnson AFB. The 916 ARW flies the KC-135.

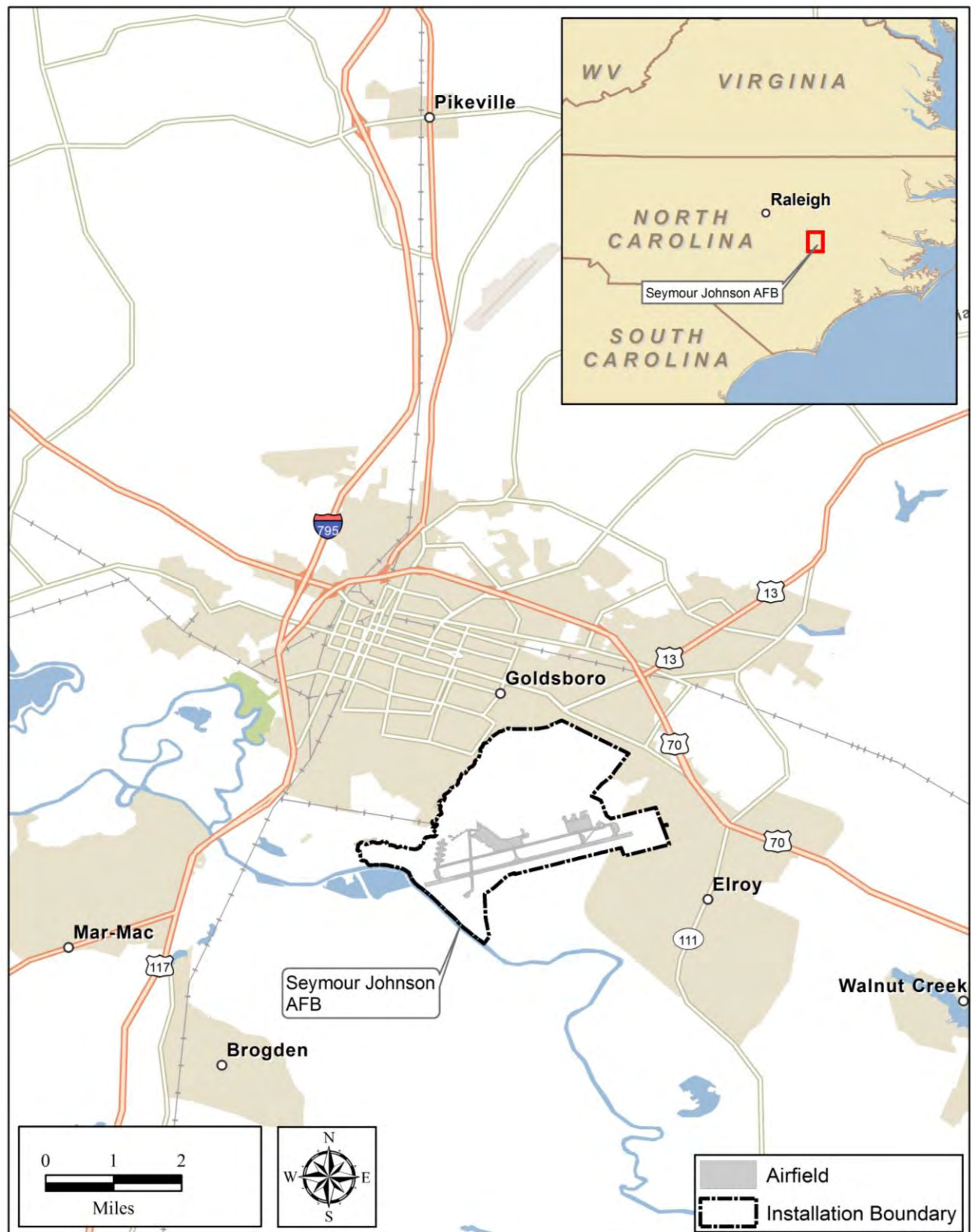


Figure 2-5. Regional Location of Seymour Johnson AFB

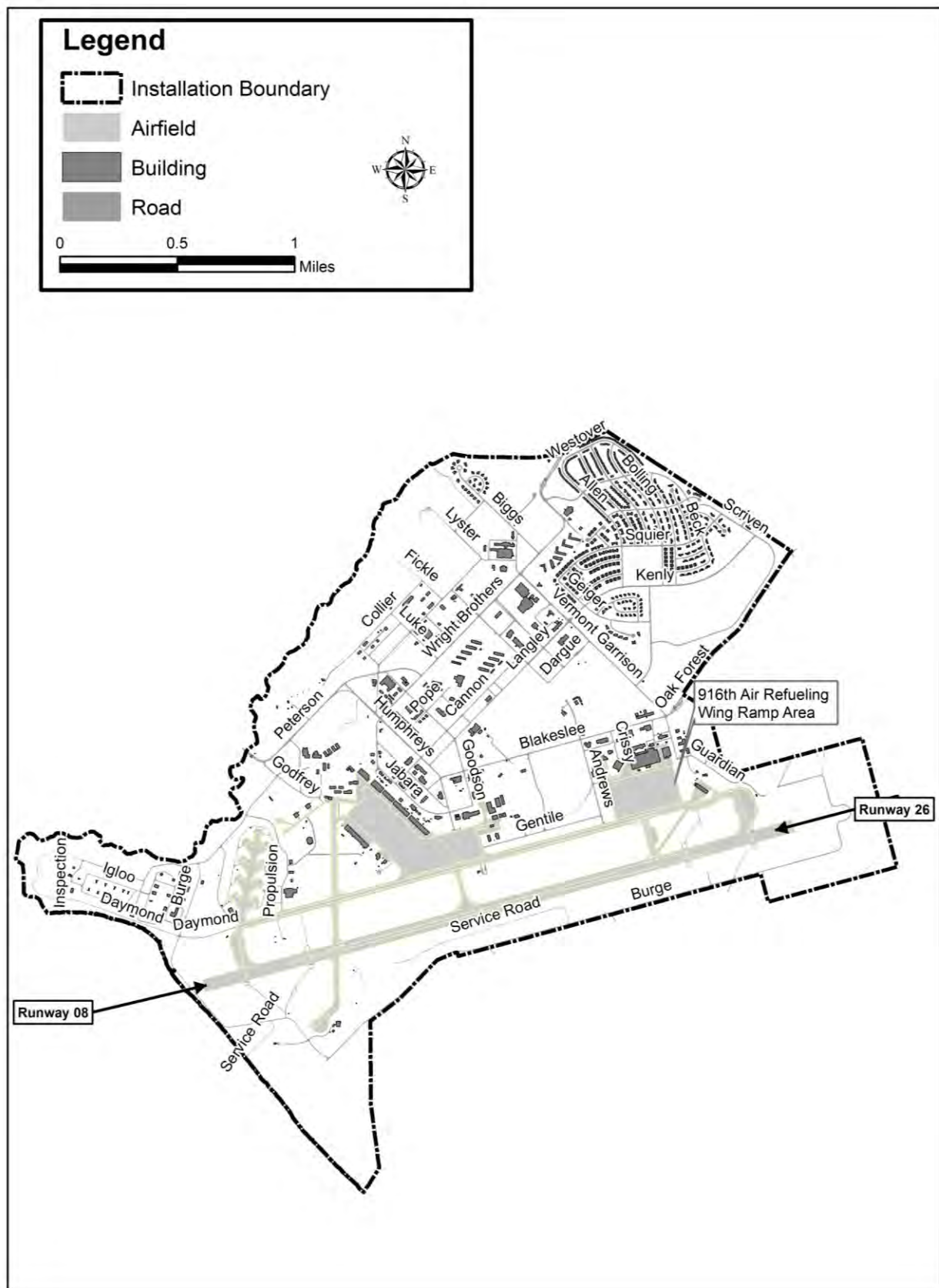


Figure 2-6. Base Overview of Seymour Johnson AFB

Seymour Johnson Field was activated in June 1942 as Headquarters (HQ), Technical School, Army Air Forces Technical Training Command. Shortly after the conclusion of World War II, the field was deactivated. In 1956 the installation was reactivated as a Tactical Air Command Base and the 83rd Fighter-Day Wing was assigned to the base. The 4 FW replaced the 83rd in December, 1957. Through the years the base has housed B-52 bombers, KC-10 and KC-135 tankers, and F-4, F-15E, and F-16 fighters.

2.5.2.2 MOB 3 Beddown Specifics

This section details the actions that would occur at Seymour Johnson AFB if selected to base 12 KC-46A aircraft for the MOB 3 mission. The MOB 3 mission would replace the existing KC-135 aerial refueling mission at Seymour Johnson AFB and result in a net decrease of four PAA. The 4 FW operations at Seymour Johnson would continue unchanged.

The USAF determined that Seymour Johnson AFB's infrastructure and base resources could accommodate the basic requirements for a KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

2.5.2.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Most of these requirements are met through existing infrastructure. However, the proposed MOB 3 beddown at Seymour Johnson AFB would require some new construction, demolition of existing facilities, and renovations to some existing facilities. The projects anticipated to be required to support the KC-46A MOB 3 mission at Seymour Johnson AFB are listed in Table 2-7. The proposed redevelopment would take place near the 916 ARW parking ramp within the previously disturbed cantonment area of Seymour Johnson AFB (see Figure 2-7).

Table 2-7. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB

Project	Facility Size (square feet)
Demolition	
Hangar 4909	76,270
Building 4911	1,436
Total Square Feet	77,706
Renovation	
Building 4810, Logistics Readiness Squadron/Supply	3,983
Building 4822, FuT	41,635
Building 4828, KC-46A Various Shops	24,004
Building 4908, Maintenance	32,421
Building 4916, Flight Simulators (WST/BOT), Squadron Operations	40,009
Total Square Feet	142,052
New Construction	
2-Bay Hangar (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops) ^a	180,095
Building 4906, AFE addition	2,551
Total Square Feet	182,646

^a This project includes a new apron access from the new two-bay hangar to the parking ramp.

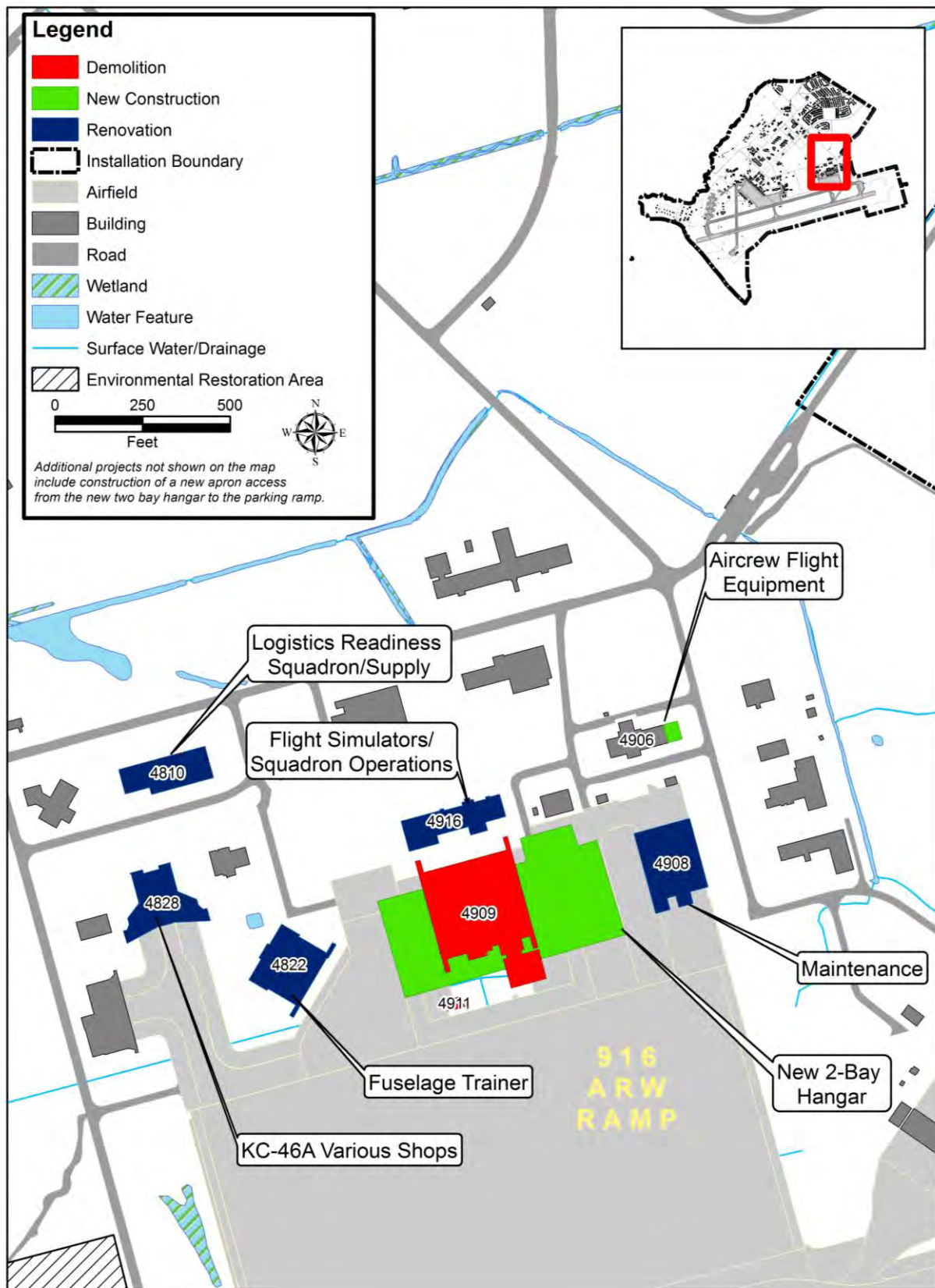


Figure 2-7. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Seymour Johnson AFB

One new two-bay hangar would be constructed along the existing 916 ARW flightline area to support the replacement mission at Seymour Johnson AFB. Construction of this facility would require the demolition of Building 4911 and Hangar 4909. New construction would also be required for an expansion to Building 4906 to house the AFE function. Renovations would be required in five buildings (4810, 4822, 4828, 4908, and 4916) to accommodate mission personnel and equipment storage. Building 4901 would be used to house the Combat Crew Communication, but no renovations would be required.

2.5.2.2.2 Personnel

The 916 ARW at Seymour Johnson AFB is authorized 1,315 personnel: 192 military, 28 DoD Civilians, and 1,095 part-time Reservists (Table 2-8). Currently, the 916 ARW has approximately 1,329 personnel, which includes 14 contractors in addition to the 1,315 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-8. Personnel Changes for the KC-46A MOB 3 Mission at Seymour Johnson AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	188	-29	159
Active Reserve	4	0	4
Dual Status Technician (Reserve, civilians, Federal)	268	+67	335
Non-Dual Status (DoD civilians)	28	0	28
Contractors ^a	14	+15	29
Subtotal	502	+53	555
Part Time			
Drill Status Reservists	1,095	-101	994
Total Personnel Authorizations^b	1,597	-48	1,549
Total Personnel on Base^c	1,329	-115	1,214

^a Contractors are not authorized on the UMD. They are categorized as “other base personnel.”

^b Some personnel work off-site but are assigned to the unit.

^c Total personnel supporting the 916 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Seymour Johnson AFB would result in a net decrease of 115 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 488 dependents currently associated with the non-contractor, full-time personnel in the 916 ARW at Seymour Johnson AFB live in communities surrounding the installation. Approximately 62 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.2.2.3 Aircraft Operations

The 916 ARW currently flies 756 sorties per year (Table 2-9), with each sortie conducting approximately 1 additional practice approach per sortie on average. Of the 2,568 total annual airfield operations flown by the 916 ARW, approximately 13 percent are flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). The four stationed F-15E fighter squadrons comprise the majority of aircraft operations at Seymour Johnson AFB, flying 55,800 operations annually. A variety of military transient aircraft conduct operations at Seymour Johnson AFB, including C-130, C-17, and others. F-15E and transient aircraft both conduct only 2 percent of total airfield operations during acoustic night.

Table 2-9. Baseline Airfield Operations at Seymour Johnson AFB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-135	748	8	567	189	914	142	2,229	339	2,568
F-15E	18,000	0	16,919	1,081	19,575	225	54,494	1,306	55,800
Transient	459	12	467	4	0	0	926	16	942
Total	19,207	20	17,953	1,274	20,489	367	57,649	1,661	59,310

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern. Data are based on information provided by the 916 ARW.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct a higher number of arrivals and patterns without a corresponding number of night departures. The same applies for F-15E.

After the aircraft beddown, KC-46A aircrews associated with the proposed MOB 3 mission would fly approximately 1,270 annual sorties and an average of 1.4 additional practice approaches per sortie, for a total of 4,314 operations per year (Table 2-10). As is the case with current KC-135 operations, KC-46A aircrews would conduct many of their practice airfield approaches at other airfields to de-conflict with the F-15E mission at Seymour Johnson AFB. However, per sortie on average, KC-46A aircrews would conduct a larger number of additional practice approaches at home base than KC-135 aircrews. The increased number of home base practice approaches per sortie and the increased frequency of usage of each KC-46A aircraft would result in the total number of annual tanker airfield operations increasing by 68 percent following beddown of the KC-46A. This increase would occur despite the 25 percent reduction in number of tanker aircraft assigned to the base. KC-46A aircrews would conduct 5 percent of total operations during acoustic night. Seymour Johnson AFB-based KC-46A aircrews would primarily use the Kinston Regional Jetport for off-station practice approaches, conducting up to 1,623 airfield operations at that location (Figure 2-8). Other airfields would be used on an occasional basis.

Table 2-10. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Seymour Johnson AFB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-46A	1,270	0	1,143	127	1,685	89	4,098	216	4,314 ^c
F-15E	18,000	0	16,919	1,081	19,575	225	54,494	1,306	55,800
Transient	459	12	467	4	0	0	926	16	942
Total	19,729	12	18,529	1,212	21,260	314	59,518	1,538	61,056

^a An operation is the accomplishment of a single maneuver such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures. The same applies for F-15E.

^c The annual total represents a combination of operations resulting from local training sorties and mission sorties.

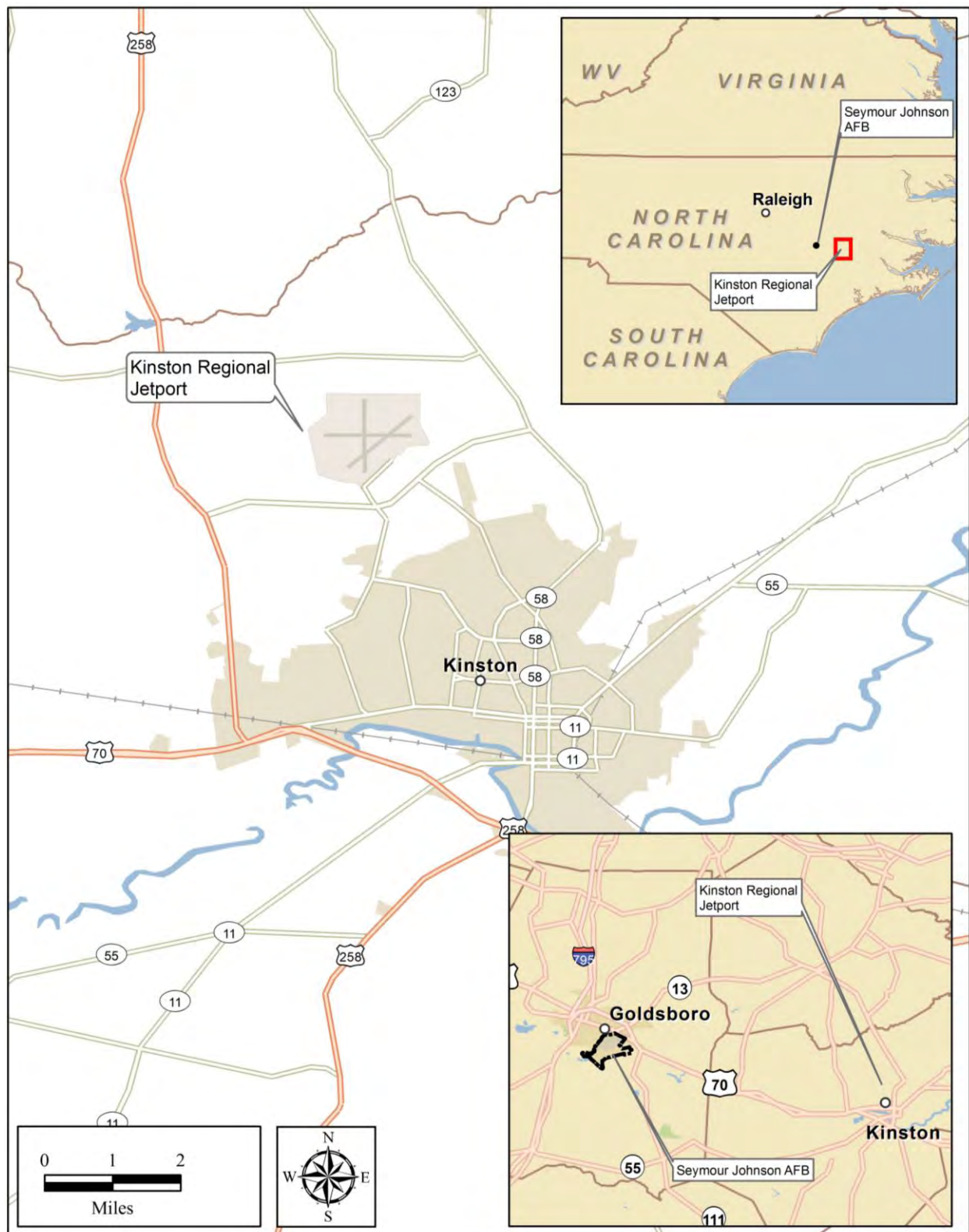


Figure 2-8. Auxiliary Airfield for Seymour Johnson AFB

2.5.3 Tinker Air Force Base, Oklahoma

The USAF is considering Tinker AFB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. The 12 KC-46A aircraft would replace the 8 KC-135 aircraft currently stationed at Tinker AFB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations associated with implementation of the MOB 3 mission.

2.5.3.1 Tinker AFB Overview

Tinker AFB is located in Oklahoma County, Oklahoma, within Oklahoma City limits (see Figure 2-9). The installation is located 10 miles southeast of downtown. Nearby towns include Midwest City to the north and Del City to the northwest.

The installation encompasses approximately 5,588 acres of land and hosts two runways. Runway 18/36 is a north-south runway that is 11,100 feet long and 200 feet wide. Runway 13/31 is a crosswind runway that is 10,000 feet long and 200 feet wide. Figure 2-10 shows an overhead view of the base.

The host unit at Tinker AFB is the 72nd Air Base Wing (ABW). The 72 ABW provides base installation and support services for the Oklahoma City Air Logistics Complex (OC-ALC), the Air Force Sustainment Center (AFSC), and more than 45 associate units assigned to six MAJCOMs. The OC-ALC performs depot maintenance on KC-135, B-1B, B-52, F-35, and E-3 aircraft and will provide depot maintenance on the KC-46A. The OC-ALC also performs maintenance for the Navy E-6 and for select aircraft engines within the USAF, ANG, Navy, and foreign military inventories.

The AFSC HQ, located at Tinker AFB, provides expeditionary capabilities to the warfighter through depot maintenance, supply chain management, and installation support. The AFSC consolidates oversight of the maintenance missions performed at OC-ALC, Warner Robins Air Logistics Complex (ALC), and Ogden ALC. The AFSC also has responsibility for supply chain management at Tinker and Scott AFBs.

Tinker AFB is home to six other major DoD, USAF, and Navy activities, including the 552nd Air Control Wing, the Navy's Strategic Communications Wing 1, the 38th Cyberspace Engineering Installation Group, Defense Logistics Agency (DLA) Distribution, the Defense Information Security Agency (DISA) Defense Enterprise Computing Center, and the 507th ARW.

The 507 ARW is the largest AFRC flying unit in the State of Oklahoma. The Wing operates and maintains 8 KC-135. The 507 ARW reports to the 4th Air Force and performs daily missions in support of AMC and the U.S. Strategic Command.

Tinker AFB's history began with an order in April 1941 establishing the installation as a maintenance and supply depot. During World War II, the installation's industrial facilities repaired B-24 and B-17 bombers and fitted B-29s for combat. The installation has continued to operate through the Korean Conflict, the Vietnam War, and Operations Desert Shield and Desert Storm.

2.5.3.2 MOB 3 Beddown Specifics

This section details the actions necessary at Tinker AFB if selected for the basing of the KC-46A MOB 3 mission. The MOB 3 mission would replace the existing KC-135 mission at Tinker AFB. The USAF determined that Tinker AFB's infrastructure and base resources could accommodate the basic requirements for a KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

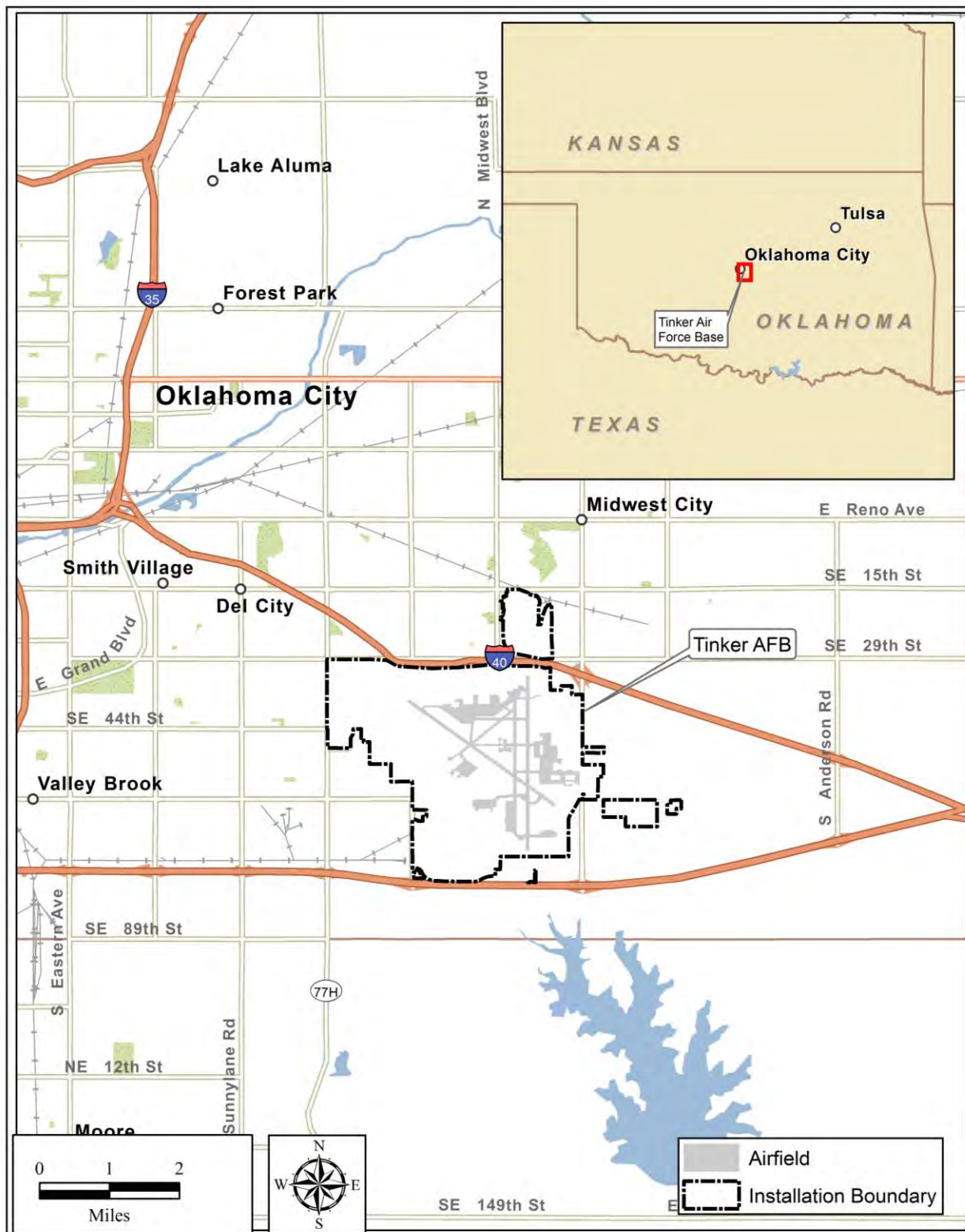
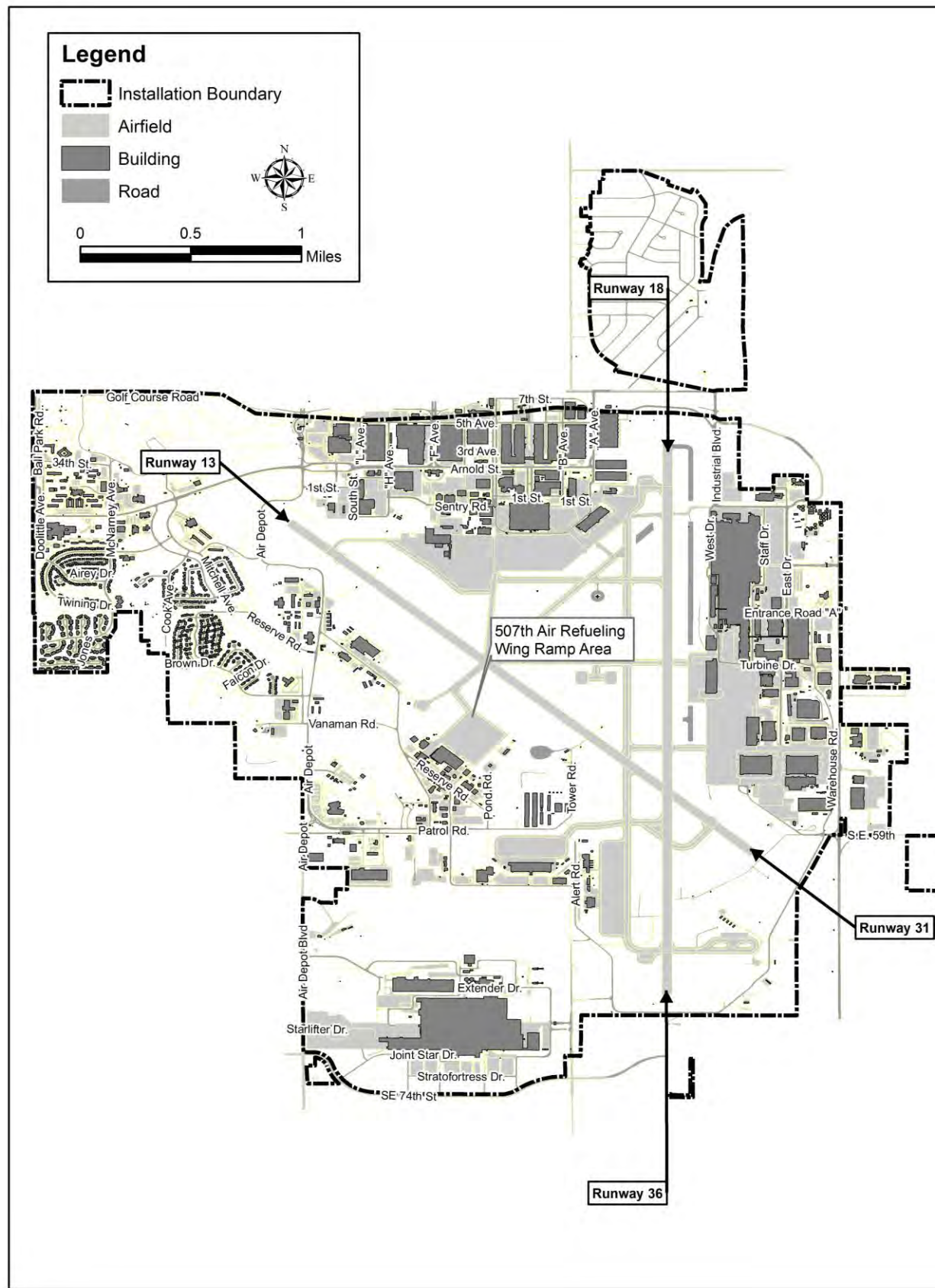


Figure 2-9. Regional Location of Tinker AFB



2.5.3.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. Tinker AFB has the basic physical real estate and infrastructure to beddown the KC-46A MOB 3 mission; however, certain projects are required to support the KC-46A MOB 3 beddown at Tinker AFB (Table 2-11). Some of the existing facilities, airfield ramp space, and hangars are currently utilized for the day-to-day KC-135 missions. Due to ongoing base operations and the KC-46A aircraft mission requirements, new construction, demolitions, and renovations would be required for the KC-46A MOB 3 mission (see Figure 2-11).

Table 2-11. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

Project	Facility Size (square feet)
Demolition	
Building 1030 ^a (to make room for new 2-Bay Hanger with Apron Access)	99,184
Building 1067 (to make room for new 2-Bay Hanger with Apron Access)	11,460
Building 1068 ^a (to make room for new 2-Bay Hanger with Apron Access)	19,775
Building 1069 (to make room for new 2-Bay Hanger with Apron Access)	250
Deicing Detention Basin	7,330
Total Square Feet	137,999
Renovation	
Hangar 1053, Various KC-46A Shops and Storage	10,000
Building 1056, Maintenance Leadership Facility	10,000
Building 1082, FuT	15,000
Hydrant Pit repositioning	Not Applicable
Total Square Feet	35,000
New Construction	
2-Bay Hanger with Apron Access (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops)	200,000
Flight Simulators (WST, BOT)	10,500
Ramp and Shoulder expansion	114,000
Total Square Feet	324,500

^a Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

Two new facilities and additional ramp space would be constructed to support the new mission at Tinker AFB. The largest new construction would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and would also require the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities and within the current hydrant fueling system on the current KC-135 ramp.

Interior renovations would occur in Hangar 1053 and Buildings 1056 and 1082 to accommodate mission personnel and equipment storage. Although Buildings 11, 260, 469, 1048, 1059, 1071, and 1112 would be used to house various KC-46A functions, including logistics warehousing, engine storage, maintenance, squadron operations, and airfield equipment, no renovations would be required for the use of these buildings. The aircraft requirements used to determine ramp parking would require a reconfiguration of parking spaces on the current KC-135 ramp. This relocation of parking spaces would require the existing hydrant pits associated with each KC-135 aircraft to be relocated to the proposed KC-46A parking locations.

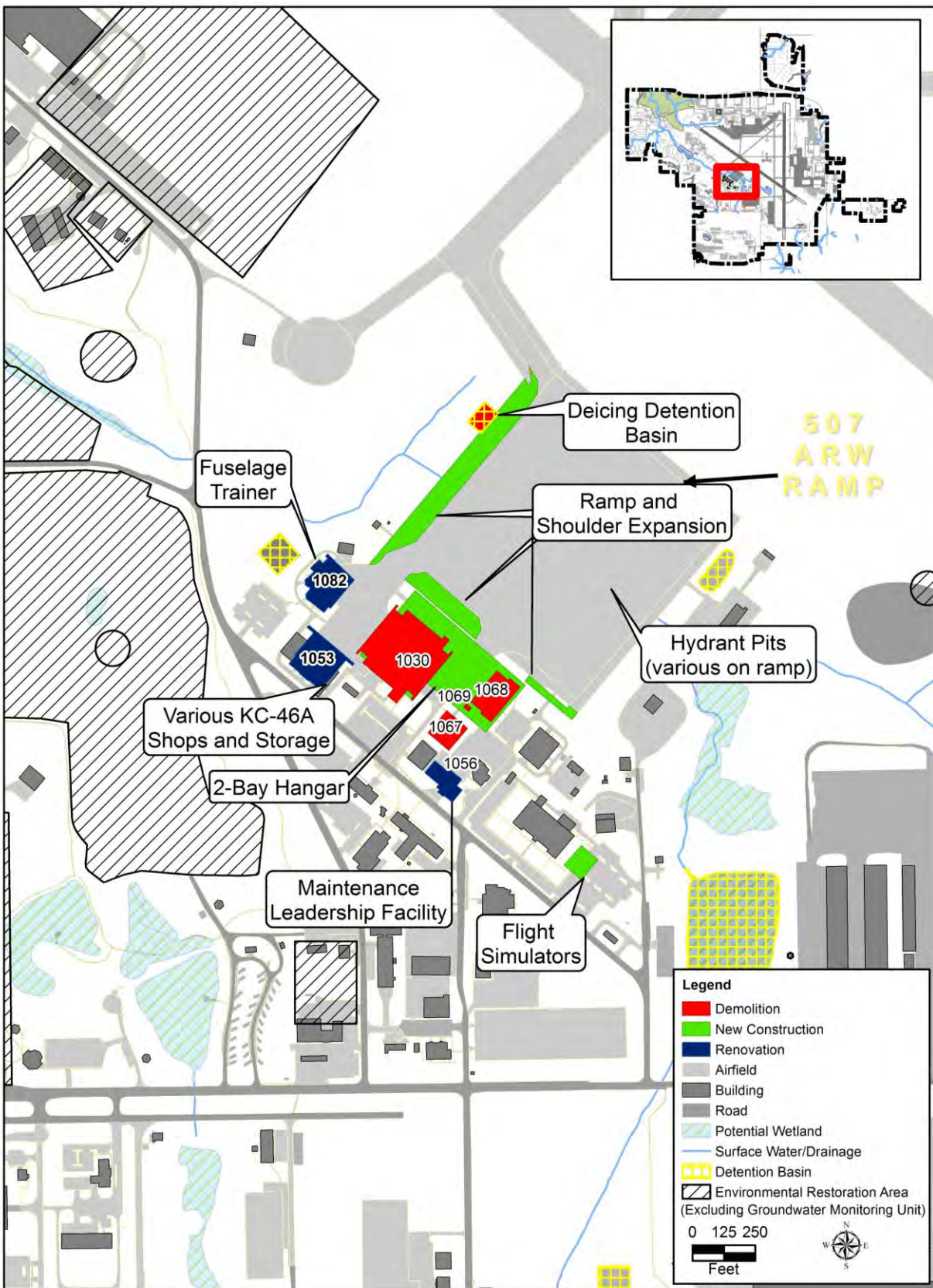


Figure 2-11. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Tinker AFB

2.5.3.2.2 Personnel

The 507 ARW at Tinker AFB is authorized 1,032 personnel: 3 military, 27 DoD Civilians, and 1,002 part-time Reservists (Table 2-12). AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-12. Personnel Changes for the KC-46A MOB 3 Mission at Tinker AFB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	3	0	3
Dual Status Technician (Reserve, civilians, Federal)	214	+129	343
Non-Dual Status (DoD civilians)	27	+5	32
Contractors ^a	0	+15	15
Subtotal	244	+308	552
Part Time			
Drill Status Reservists	1,002	+232	1,234
Total Personnel Authorizations^b	1,246	+540	1,786
Total Personnel on Base^c	1,032	+411	1,443

^a Contractors are not authorized on the UMD. They are categorized as “other base personnel.”

^b Some personnel work off-site but are assigned to the unit.

^c Total personnel supporting the 507 ARW is the sum of all categories minus the number of people with dual status.

Replacement of the KC-135 mission with the KC-46A MOB 3 mission at Tinker AFB would result in a net increase of 411 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 397 dependents currently associated with the non-contractor, full-time personnel in the 507 ARW at Tinker AFB live in communities surrounding the installation. Approximately 476 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.3.2.3 Aircraft Operations

The 507 ARW currently flies 400 sorties per year and an average of 2 additional practice approaches per sortie, for a total of 2,399 total annual airfield operations (Table 2-13). Of the total annual operations flown by the 507 ARW, approximately 11 percent are flown during acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). Other based aircraft (i.e., E-3, B-737, and E-6) conduct a combined total of 18,708 operations per year, with 10 percent of their total operations occurring during acoustic night. An additional 4,468 operations are conducted annually at Tinker AFB by KC-135, E-3, B-52, and B-1 aircraft as part of the depot maintenance mission. A wide variety of transient aircraft visit the base, conducting a total of 4,988 operations annually. Depot and transient aircraft infrequently conduct flying operations during acoustic night.

Table 2-13. Baseline Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-135	400	0	360	40	1,371	228	2,131	268	2,399
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	4,065	84	3,877	272	22,042	1,859	29,984	2,215	32,199

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 507 ARW.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-135 aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

After the aircraft beddown, KC-46A aircrews associated with the proposed MOB 3 mission would fly approximately 1,150 annual sorties and an average of 3.5 additional practice approaches per sortie, for a total of 6,440 operations per year (Table 2-14). The 168 percent increase in annual tanker operations would result from an increase in the number of assigned tanker aircraft (from 8 KC-135 to 12 KC-46A), an increase in the frequency at which each aircraft is flown, and an increase in the number of practice approaches per sortie. KC-46A aircrews would conduct approximately 11 percent of total operations during acoustic night. KC-46A aircraft would begin to be processed through depot maintenance, increasing total depot airfield operations from 4,468 to 6,104 per year. Practice approaches would be conducted at airfields other than Tinker AFB on an occasional basis.

Table 2-14. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Tinker AFB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-46A	1,150	0	1,034	116	3,547	593	5,731	709	6,440 ^c
Based Aircraft	2,025	75	1,877	223	12,877	1,631	16,779	1,929	18,708
Depot	659	0	659	0	4,786	0	6,104	0	6,104
Transient	981	9	981	9	3,008	0	4,970	18	4,988
Total	4,815	84	4,551	348	24,218	2,224	33,584	2,656	36,240

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional approach/closed pattern.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

^c The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.5.4 Westover Air Reserve Base, Massachusetts

The USAF is considering Westover ARB as a reasonable alternative for the MOB 3 mission of 12 KC-46A aircraft. The proposed KC-46A MOB 3 mission would add to the existing missions at Westover ARB. Section 2.3.1 describes the personnel changes, physical and development changes, and airfield operations associated with implementation of the MOB 3 mission.

2.5.4.1 Westover ARB Overview

Westover ARB is located in Hampden County, Massachusetts, within the city limits of Chicopee and Ludlow (see Figure 2-12). The installation is located six miles northeast of downtown Springfield, Massachusetts. Other nearby towns include Holyoke and West Springfield.



Figure 2-12. Regional Location of Westover ARB

The installation encompasses approximately 2,390 acres of land and hosts two runways. Runway 05/23 is a north-south runway that is 11,598 feet long and 300 feet wide. Runway 15/33 is a crosswind runway that is 7,082 feet long and 150 feet wide. Figure 2-13 shows an overhead view of the base.

The 439th Airlift Wing (AW), a unit of AFRC, is assigned to Westover ARB and operates 14 C-5B airlifters. The 439 AW reports to the 4th Air Force. The 337th Airlift Squadron is the Wing's flying unit.

Westover AFB opened in April 1940 as part of a war-readiness appropriation signed by President Franklin D. Roosevelt. The base served as a bomber training base and as a station for anti-submarine operations. After World War II, the base took on a role supporting the Berlin Airlift. Westover AFB remained active during the Cold War as a Military Air Transport Service Base. In 1955, the 4050 ARW, flying the KC-97 tanker, was assigned as the host unit responsible for base operations. The first KC-135 Stratotankers arrived at the base in August 1957. From 1955 to 1970, the 8th Air Force was headquartered at Westover AFB. The base was turned over to AFRC in 1974.

Since 1974, Westover ARB has been an AFRC base. The base operated C-130 Hercules and C-123 Provider aircraft until 1987, when the C-5 became the primary aircraft operating from the base. Since 1987, C-5 aircraft have operated at Westover ARB. The C-5 aircraft at Westover ARB have been used to fly missions in support of United Nations Peacekeeping, Desert Shield, Desert Storm, Kosovo, the Global War on Terror, and other missions across the globe. C-5 aircraft from Westover ARB were also used in support of firefighting activities during the 1988 Yellowstone National Park fires. In addition to AFRC units, the base is also home to an Army Reserve Training Battalion and a unit of Navy Seabees.

2.5.4.2 MOB 3 Beddown Specifics

This section details the actions necessary at Westover ARB if selected for the basing of the KC-46A MOB 3 mission. Implementation of the MOB 3 mission would beddown 12 PAA KC-46A aircraft, facilities and infrastructure, and manpower. The USAF determined that infrastructure and base resources at Westover ARB could accommodate the basic requirements for the KC-46A MOB 3 mission within the constraints set by the alternative narrowing process described in Section 2.2.

2.5.4.2.1 Facilities and Infrastructure

The overall facility requirements for the MOB 3 beddown are described in Section 2.3.1.1. The projects anticipated to be required to support the KC-46A MOB 3 mission at Westover ARB are listed in Table 2-15 and illustrated on Figure 2-14. Although some of these requirements are met through existing infrastructure and facilities on Westover ARB, new construction, renovation, and demolition would be required.

There is no military dining facility located on Westover ARB. Therefore, personnel associated with the proposed KC-46A MOB 3 mission would utilize off base commercial dining facilities. Also, childcare is not available on Westover ARB. The EIS will assume that childcare will not be available on the installation.

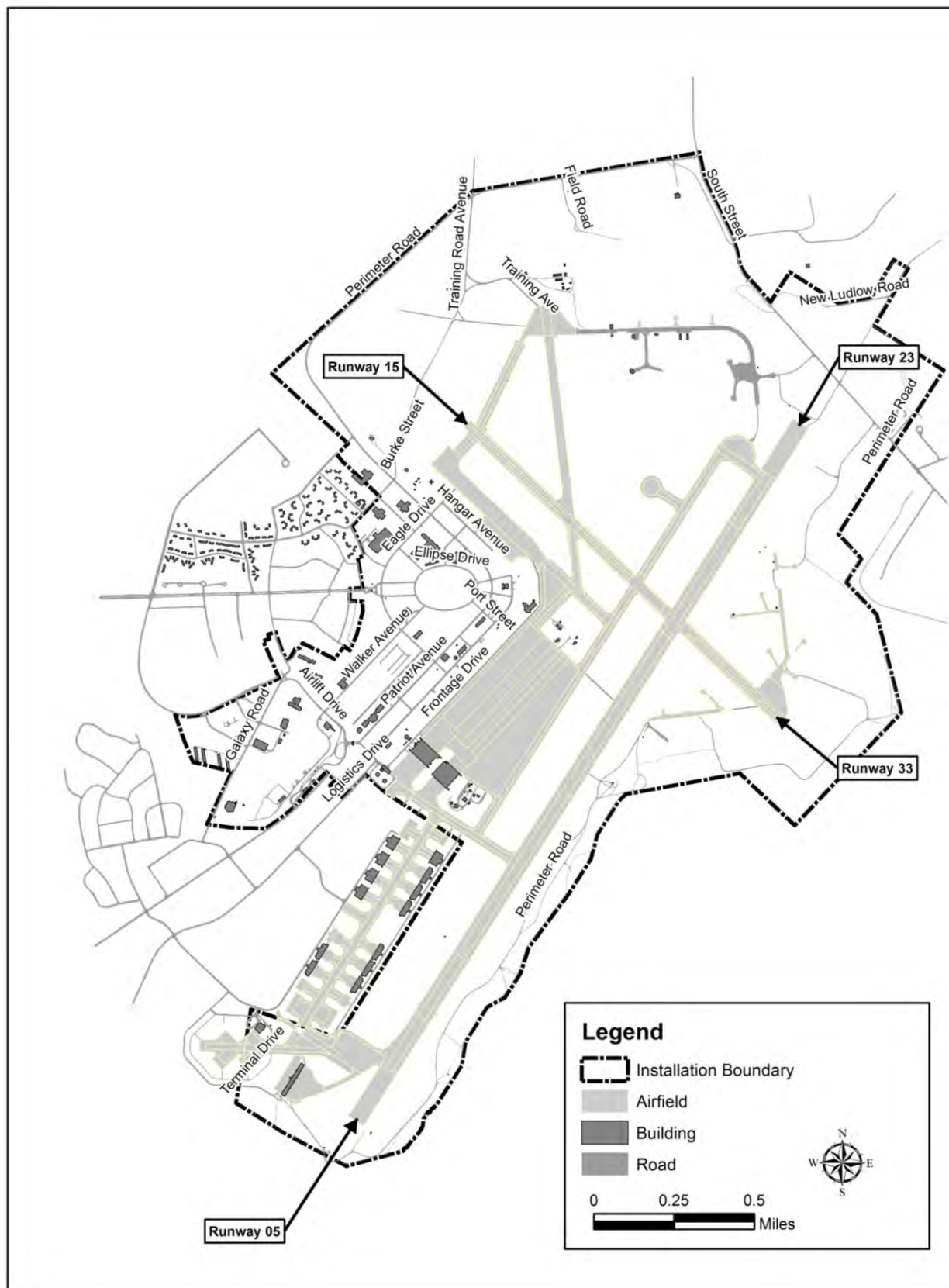


Figure 2-13. Base Overview of Westover ARB

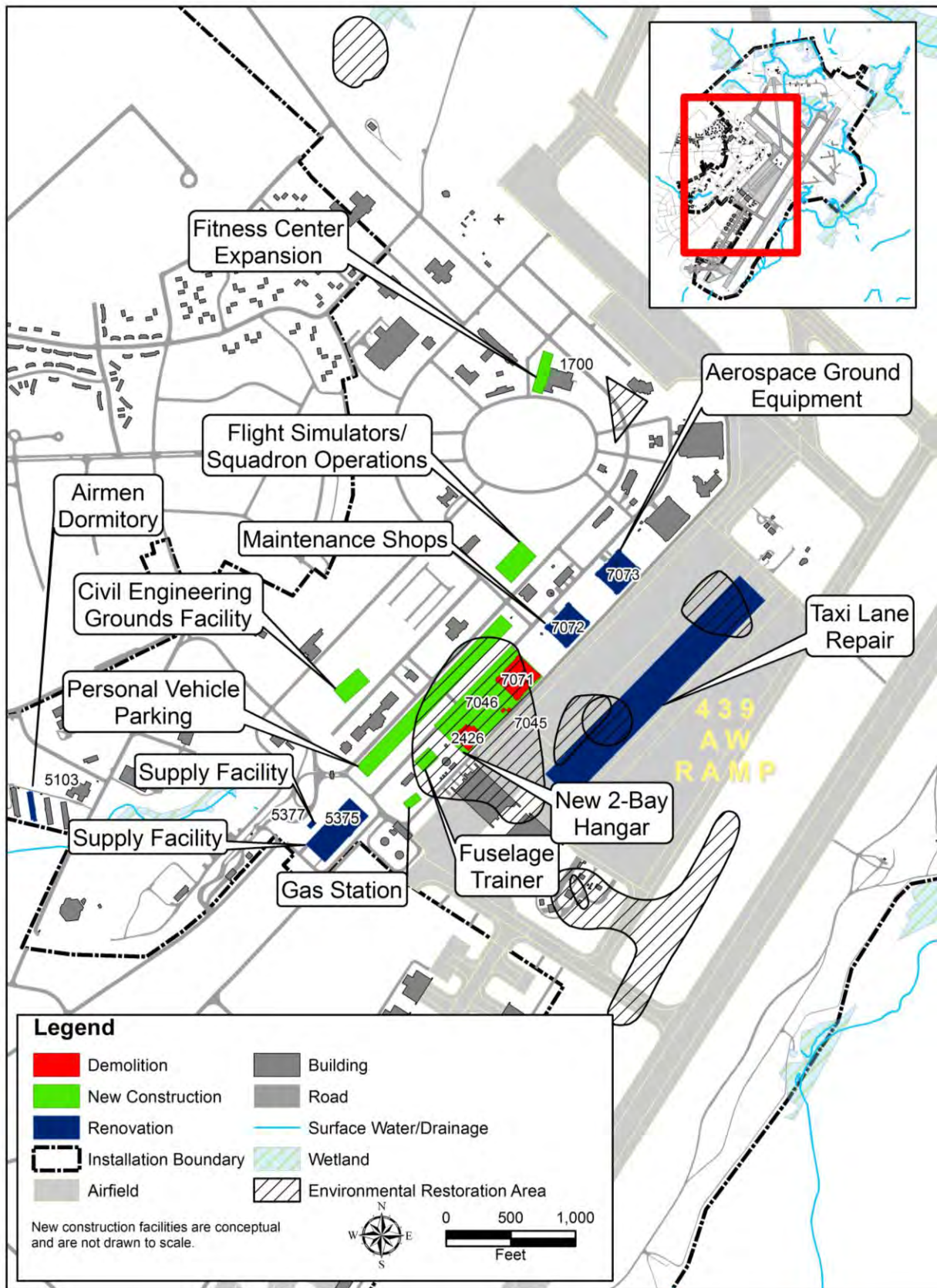


Figure 2-14. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB

Table 2-15. Facilities and Infrastructure Projects for the KC-46A MOB 3 Mission at Westover ARB

Project	Facility Size (square feet)
Demolition	
Building 2426 ^a	24,588
Building 7071 ^a	74,313
Building 7045, Gas station relocation	720
Building 7046, Gas station relocation	720
Total Square Feet	100,341
Renovation	
Parking Ramp Taxi Lane Repair	941,585
Building 7072, Maintenance Shops	1,000
Building 7073 (Hangar 5), AGE	15,000
Building 5103, Airmen Dormitory	28,579
Building 5375 and 5377, Supply Facilities (secure storage vault and fencing)	Not applicable
Total Square Feet	986,164
New Construction	
2-Bay Hanger (Fuel Cell, Corrosion Control, Wash-Rack, AMU, Back-Shops, and Personal Vehicle Parking)	217,772 (Parking is additional 164,858)
Flight Simulators/Squadron Operations	65,626
Fuselage Trainer	13,018
Civil Engineering Grounds Facility	7,503
Gas Station (Relocate)	1,440
Fitness Center Expansion	26,242
Total Square Feet	496,459

^a Potential relocation of underground cables, manholes, and duct work would be associated with these projects.

Six new facilities would be constructed to support the new mission at Westover ARB. The largest new construction would be a 2-bay hangar built along the existing flightline. Construction of this facility would require the demolition of Buildings 2426 and 7071, and the relocation of a government vehicle gas station (Buildings 7045 and 7046). Other new construction includes two new training facilities (flight simulators/squadron operations and FuT); a new facility for Civil Engineering Grounds; and a new addition would be constructed to the fitness center to accommodate the needs of the new Airmen associated with the KC-46A MOB 3 mission. The largest renovation project would be the repair of the taxi lane located in the center of the existing aircraft parking ramp. This renovation project would bring the airfield pavements in compliance with the requirements for the KC-46A aircraft. Minor interior renovations are proposed for Buildings 7072, 7073, 5375, and 5377. Building 5103 would be renovated to meet the housing requirements for young Airmen. Although three additional buildings would be used to support the KC-46A MOB 3 mission, no renovations or other work would be required. Building 7075, the existing AFRC aerial port and Airlift Control Element, would also house KC-46A AME and potable water truck parking. Buildings 1610 and 7087 (Hangar 1) would be used by KC-46A personnel and as additional storage space.

2.5.4.2.2 Personnel

The 439 AW at Westover ARB is authorized 2,423 personnel: 66 military, 333 DoD Civilians, and 2,024 part-time Reservists (Table 2-16). Currently, the 439 AW has approximately 2,654 personnel, which includes 231 contractors in addition to the 2,423 authorized personnel. AMC would have an Active Duty unit associated with the AFRC host wing.

Table 2-16. Personnel Changes for the KC-46A MOB 3 Mission at Westover ARB

Personnel	Current Authorized	KC-46A MOB 3 Mission Related Changes	Total
Full Time			
Active Associate	0	+159	159
Active Reserve	66	0	66
Dual Status Technician (Reserve, civilians, Federal)	416	+237	653
Non-Dual Status (DoD civilians)	333	0	333
Contractors ^a	231	+15	246
Subtotal	1,046	+411	1,457
Part Time			
Drill Status Reservists	2,024	+453	2,477
Total Personnel Authorizations^b	3,070	+864	3,934
Total Personnel on Base^c	2,654	+627	3,281

^a Contractors are not authorized on the UMD. They are categorized as "other base personnel."

^b Some personnel work off-site but are assigned to the unit.

^c Total personnel supporting the 439 AW is the sum of all categories minus the number of people with dual status.

Because the KC-46A MOB 3 mission would be a new mission at Westover ARB, the beddown would result in a net increase of 627 on-base personnel. Dependents were estimated at 2.5 times per 65 percent of full-time personnel, excluding contractors. Approximately 1,324 dependents associated with the non-contractor, full-time personnel at Westover ARB live in communities surrounding the installation. Approximately 644 dependents and family members would be anticipated to accompany the non-contractor, full-time personnel associated with the KC-46A MOB 3 mission.

2.5.4.2.3 Aircraft Operations

The 439 AW operates the C-5 aircraft, flying approximately 121 sorties per year and an average of six additional practice approaches per sortie, for a total 1,724 total operations annually (Table 2-17). Westover ARB does not have an existing refueling mission. The majority of aircraft operations at Westover ARB are conducted by transient military and civilian aircraft. The majority of transient military operations are conducted by C-130 Hercules and UH-60 Blackhawk helicopters. Operations by all aircraft types during acoustic night are infrequent.

Table 2-17. Baseline Airfield Operations at Westover ARB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
C-5	121	0	121	0	1,482	0	1,724	0	1,724
Transient	1,645	16	1,645	16	4,921	0	8,211	32	8,243
Civilian	2,920	0	2,920	0	1,204	0	7,044	0	7,044
Total	4,686	16	4,686	16	7,607	0	16,979	32	17,011

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern. Data are based on information provided by the 439 AW.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

KC-46A aircrews associated with the MOB 3 mission would fly approximately 647 annual sorties and 4.4 additional practice approaches per sortie, for a total of 7,032 total airfield operations. These operations would add to existing operations, which would remain unchanged after the beddown. The addition of KC-46A operations would increase the total number of operations conducted at Westover ARB by 41 percent, from 17,011 to 24,043 (Table 2-18). Approximately 5 percent of the total annual KC-46A sorties would be flown during acoustic

night. Practice approaches would be conducted by KC-46A aircrews at airfields other than Westover ARB on an occasional basis.

Table 2-18. Projected Annual KC-46A MOB 3 Mission End-State Airfield Operations at Westover ARB

Aircraft	Departures		Arrivals		Patterns		Total ^a		Grand Total
	Day	Night	Day	Night	Day	Night	Day	Night ^b	
KC-46A	647	0	582	65	5,451	287	6,680	352	7,032 ^c
C-5	121	0	121	0	1,482	0	1,724	0	1,724
Transient	1,645	16	1,645	16	4,921	0	8,211	32	8,243
Civilian	2,920	0	2,920	0	1,204	0	7,044	0	7,044
Total	5,333	16	5,268	81	13,058	287	23,659	384	24,043

^a An operation is the accomplishment of a single maneuver, such as a takeoff/departure, an arrival/landing, or half of an additional practice approach/closed pattern.

^b Night is defined as acoustic night (i.e., 10:00 P.M. to 7:00 A.M.). KC-46A aircrews could depart prior to 10:00 P.M. but return to base and conduct arrivals and approaches after 10:00 P.M.; thus they could conduct night operations (arrivals and patterns) without conducting night departures.

^c The annual total represents a combination of operations resulting from local training sorties and mission sorties.

2.6 NO ACTION ALTERNATIVE

Section 1502.14(d) of the National Environmental Policy Act (NEPA) requires the analysis of a No Action Alternative. Analysis of a No Action Alternative provides a benchmark, enabling decision makers to compare the magnitude of the environmental effects to the proposed action or alternatives. No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward.

At Grissom ARB, Seymour Johnson AFB, and Tinker AFB, the No Action Alternative for this Draft EIS reflects the *status quo* (i.e., the KC-46A MOB 3 beddown would not occur). No KC-46A aircraft would arrive, and all existing aircraft would remain in place. No construction, renovation, or demolition of any structure or other infrastructure would occur. No KC-46A personnel changes would occur and existing flight operations would remain unchanged.

At Westover ARB, the No Action Alternative considers the complete conversion of the C-5B fleet to the C-5M aircraft. No KC-46A aircraft would arrive and no construction, renovation, or demolition of any structure or other infrastructure would occur. No KC-46A personnel changes would occur and existing flight operations would remain unchanged.

The No Action Alternative has been carried forward in the EIS per CEQ regulations. The No Action Alternative serves as a reference for existing impacts that can be continued into the future and used to compare impacts of the action alternatives.

Evaluation of the No Action Alternative compares the effects of implementing the KC-46A MOB 3 beddown with the effects of the No Action Alternative at each base and for each resource area.

At each base, ongoing and currently planned activities, missions, and programs would continue, whether or not the basing of the KC-46A MOB 3 mission would be implemented. These activities have been approved by the USAF and supported by existing NEPA documentation. The No Action Alternative is described for each resource area in Section 4.5.

2.7 COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-19 summarizes the potential environmental consequences from Chapter 4 where the MOB 3 mission requirements from Chapter 2 are overlaid on the baseline conditions from Chapter 3. The consequences are presented for each environmental resource area and are described for each Draft EIS alternative.

This summary comparison of environmental consequences provides an overview of the consequences associated with implementation of the MOB 3 mission at each base. The following NEPA activities will be completed to ensure that decision makers have a comprehensive understanding of the potential environmental consequences of their decision.

- Documentation of existing environmental conditions for each alternative base. The existing conditions for these resources relied heavily on recent environmental materials and Federal and state databases prepared at and near each base.
- Base-specific assessments of environmental consequences of the beddown of the KC-46A MOB 3 mission. Each assessment overlaid the project details upon the existing conditions to estimate potential base-specific environmental consequences.

THIS PAGE INTENTIONALLY LEFT BLANK

Table 2-19. Comparative Summary of Environmental Consequences

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Acoustic Environment	<p>The proposed KC-46A MOB 3 mission would replace 16 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in a decrease of 1,490 annual airfield operations, or a 9 percent decrease in overall annual airfield operations at Grissom ARB.</p> <p>Affected by 65 dB L_{Adn} or greater:</p> <p>Off-base Acres: -21</p> <p>Estimated off-base residents: 0</p>	<p>The proposed KC-46A MOB 3 mission would replace 16 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 1,746 annual airfield operations, or a 3 percent increase in overall annual airfield operations at Seymour Johnson AFB.</p> <p>Affected by 65 dB L_{Adn} or greater:</p> <p>Off-base Acres: +1</p> <p>Estimated off-base residents: +1</p>	<p>The proposed KC-46A MOB 3 mission would replace 8 KC-135 aircraft with 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 4,041 annual airfield operations, or a 13 percent increase in overall annual airfield operations at Tinker AFB.</p> <p>Affected by 65 dB L_{Adn} or greater:</p> <p>Off-base Acres: +7</p> <p>Estimated off-base residents: +6</p>	<p>The proposed KC-46A MOB 3 mission would add 12 KC-46A aircraft. The proposed MOB 3 mission would result in an increase of 7,032 annual airfield operations, or a 41 percent increase in overall annual airfield operations at Westover ARB.</p> <p>Affected by 65 dB L_{Adn} or greater:</p> <p>Off-base Acres: -396</p> <p>Estimated off-base residents: -38</p> <p>C-5 aircraft operations are the largest driver of noise at Westover ARB. The planned replacement of C-5B models with the quieter C-5M model has the largest influence on noise at Westover ARB. It is anticipated that replacement of the C-5B with the C-5M would result in an overall decrease in noise at Westover ARB, even with the addition of the 12 KC-46A aircraft as part of the proposed MOB 3 mission.</p>	<p>Under the No Action Alternative at Grissom ARB, Seymour Johnson AFB, and Tinker AFB, existing flying operations would continue unchanged and construction associated with the proposed KC-46A MOB 3 mission would not occur. Noise levels would remain as they are under existing conditions, and there would be no new noise impacts.</p> <p>Under the No Action Alternative at Westover ARB, implementation of the proposed KC-46A MOB 3 mission would not occur, but conversion of the 439 AW fleet from C-5B to C-5M aircraft would be completed. The off-base area and people affected by noise levels greater than 65 dB L_{Adn} would decrease by 398 acres and 38 people, respectively.</p>
Air Quality	<p>Emissions from the proposed KC-46A MOB 3 operations would not exceed Prevention of Significant Deterioration (PSD) thresholds for any of the National Ambient Air Quality Standards (NAAQS) pollutants. No significant impacts to air quality are anticipated.</p>	<p>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for any of the NAAQS pollutants. No significant impacts to air quality are anticipated.</p>	<p>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for VOCs, carbon monoxide (CO), sulfur oxides (SO_x), particulate matter less than or equal to 10 micrometers in diameter (PM₁₀), or particulate matter less than or equal to 2.5 micrometers in diameter (PM_{2.5}).</p> <p>Nitrogen oxides (NO_x) emissions from the proposed KC-46A MOB 3 operations would exceed the 250-tons-per-year PSD threshold. These NO_x emission increases would amount to 1 percent of the total NO_x emissions generated by Oklahoma County in 2011. Given that the county attains all of the NAAQS, these NO_x emission increases would not be substantial enough to contribute to an exceedance of any NAAQS (such as the ozone and NO₂ standards). Therefore, the proposed MOB 3 mission at Tinker AFB would not result in significant air quality impacts.</p>	<p>Emissions from the proposed KC-46A MOB 3 operations would not exceed PSD thresholds for VOCs, CO, SO_x, PM₁₀, or PM_{2.5}.</p> <p>NO_x emissions from the proposed KC-46A MOB 3 operations would exceed the 250-tons-per-year PSD threshold. These NO_x emission increases would amount to 1 percent of the total NO_x emissions generated by Hampden County in 2011. Given that the county attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to an exceedance of an NAAQS. Therefore, the proposed MOB 3 mission at Westover ARB would not produce significant air quality impacts.</p>	<p>Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.2, 3.2.2, and 3.3.2. No changes would occur. No construction emissions would occur, and operational emissions would be identical to the current baseline conditions. Impacts under the No Action Alternative would be minor.</p> <p>At Westover ARB, the No Action Alternative would cause minor changes in air quality emissions. Impacts under the No Action Alternative would be minor.</p>
	Emissions from construction activities would be below any PSD pollutant threshold of 250 tons per year.				
Safety	Implementation of the proposed KC-46A MOB 3 mission is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or any increase in the risks of occurrence of those mishaps. No significant impact would occur related to bird/wildlife-aircraft strike hazard (BASH) issues. The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) and Occupational Safety and Health Administration (OSHA) requirements are implemented.				<p>Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain unchanged.</p> <p>At Westover ARB, the No Action Alternative is not anticipated to significantly change safety, as the number and types of operations would remain the same as those described under baseline conditions.</p>

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Soil and Water Resources	The total disturbed area would be less than 5 acres for new construction.	The total disturbed area would be less than 5 acres for new construction. No changes to current deicing operations would be required. Upon implementation of the proposed MOB 3 mission, the Stormwater Plan (SWP) would be revised to include an evaluation of deicing procedures and ways to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.	The total disturbed area would be less than 8 acres for new construction. Expansion of the 507 ARW parking ramp would impact approximately 3.5 acres of floodplain and approximately 45 linear feet of East Crutch Creek. East Crutch Creek is a jurisdictional water of the United States, and according to the Tulsa District of the U.S. Army Corps of Engineers (USACE), this work would be permitted using Nationwide Permit 39. Because impacts to East Crutch Creek would be less than 300 linear feet, no mitigation would be required To avoid altering the elevation, function, and capacity of the floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion. A Finding of No Practicable Alternative (FONPA) would be prepared should Tinker AFB be selected for the proposed MOB 3 mission.	The total disturbed area would be less than 12 acres. If the proposed MOB 3 mission would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, additional water quality monitoring would be required. If the sample results exceed the benchmark levels, additional controls would require evaluation and possible implementation. Because the nature of the activity (aircraft deicing) is not changing, a change to the permit would not be required. Although increases in aircraft operations could increase the amount of deicing fluid utilized, long-term, significant, adverse impacts to water quality are not anticipated to result from deicing operations associated with the proposed KC-46A MOB 3 mission at Westover ARB.	Under the No Action Alternative, conditions at each base would remain unchanged. None of the construction associated with the proposed KC-46A MOB 3 mission would occur and there would be no additional impacts to soil and water resources.
	Relevant stormwater and land disturbance permits would be required and stormwater plans would be updated. During the design phase, a variety of stormwater controls would be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. No significant impacts to soil and water resources are anticipated.				
Biological Resources	No significant impacts to biological resources or wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission.		Expansion of the 507 ARW parking ramp would impact approximately 1 acre of forested floodplain habitat. This area is described in the Integrated Natural Resource Management Plan (INRMP) as habitat for migratory bird species at risk. The USAF prepared a Biological Evaluation (BE) for the least tern, the piping plover, the whooping crane, and the red knot. The BE was submitted to the U.S. Fish and Wildlife Service (USFWS) on 19 September 2016. Based on the information contained in the BE, the USAF has determined that should Tinker AFB be selected for the proposed KC-46A MOB 3 mission, implementation of the mission may affect, but is not likely to adversely affect any of these species.	No significant impacts to biological resources or wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission. The USFWS concurred with the USAF determination that no threatened or endangered species would be affected by implementation of the proposed MOB 3 mission (See letter dated 30 June 2016, Volume II, Appendix A, Section A.6.4.2).	Under the No Action Alternative, baseline conditions at each base would remain unchanged. No vegetation or wildlife habitat would be disturbed. No additional impacts to biological resources would be anticipated.

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Cultural Resources	<p>No adverse Section 106 impacts to cultural or tribal resources are anticipated. The Indiana State Historic Preservation Office (SHPO) has concurred that no cultural resources occur at Grissom ARB. Therefore, the proposed MOB 3 mission would not have an adverse impact on cultural resources.</p> <p>The USAF has conducted consultation with tribes potentially affiliated with the base. No comments or concerns have been raised regarding tribal resources.</p>	<p>Seymour Johnson AFB has determined that no facilities are National Register of Historic Places (NRHP)-eligible, and the SHPO has concurred with this finding (see letter dated 14 June 2016, Volume II, Appendix A, Section A.5.2).</p> <p>Seymour Johnson AFB has conducted consultation with the Eastern Band of the Cherokee Nation. The tribe has indicated that they do not have any cultural or tribal resources at Seymour Johnson AFB and no interest in Wayne County.</p>	<p>Tinker AFB has determined that no historic properties would be affected. The SHPO has concurred with this finding and requested additional concurrence on archaeological resources from the Oklahoma Archeological Survey (OAS). The OAS concluded that prior to any construction, an archaeological field inspection would be required (see letter dated 19 May 2016, Volume II, Appendix A, Section A.5.3). Should Tinker AFB be selected for the proposed MOB 3 mission, an archaeological field inspection of the construction area would be completed. Col Stephanie Wilson of Tinker AFB met with Chief Harjo of the Seminole Nation of Oklahoma on 5 August 2016. Although Chief Harjo was interested in small business opportunities for the Seminole Nation of Oklahoma, he had no comments or concerns specific to the proposed KC-46A MOB 3 mission.</p>	<p>On 4 August 2016, Westover ARB submitted a letter to the Massachusetts Historical Commission (MHC) identifying the area of potential effect (APE), which includes the Historic District. This letter stated that the proposed undertaking includes the demolition of Hangar 7071 and Building 2426, contributing resources to the Historic District, and will therefore result in an adverse effect on the historic property. Pursuant to 36 CFR § 800.6(c), the letter also stated that USAF was seeking concurrence from the MHC on the adverse effect determination and will continue to consult with the MHC in order to avoid, minimize, or mitigate the potential adverse effects of the undertaking. In a response dated 26 August 2016, the MHC concurred with the USAF letter (see Volume II, Appendix A, Section A.5.4.1). Should the proposed MOB 3 mission be located at Westover ARB, the USAF would prepare Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) recordation of Hangar 7071 and Building 2426 and develop a map that identifies the boundaries of the Westover ARB Historic District. In addition, the MHC has agreed to participate in the design review process for new construction.</p> <p>Consultation with tribes potentially affiliated with the base has been completed. No issues or concerns were raised regarding tribal resources.</p>	Under the No Action Alternative, baseline conditions at each base would remain unchanged. No additional impacts to historical buildings or other cultural resources would occur.
	Inadvertent discovery of archaeological resources is considered unlikely. An inadvertent discovery of previously unrecorded cultural resources would be managed in compliance with Federal and state laws and USAF regulations.				
Land Use	<p>Implementation of the proposed MOB 3 mission would decrease the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 21 acres.</p> <p>No significant impacts to land use resources would result from the proposed MOB 3 mission.</p>	<p>Implementation of the proposed MOB 3 mission would increase the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 1 acre. The 1 acre of additional land affected by noise is not located near sensitive receptors. The anticipated noise increase to this 1-acre area would not cause unsafe conditions and would not change or conflict with any current or planned land uses in this area.</p> <p>No significant impacts to land use resources would result from the proposed MOB 3 mission.</p>	<p>Implementation of the proposed MOB 3 mission would increase the off-base area affected by noise levels of 65 dB L_{Adn} or greater by 7 acres. These 7 acres are not located near sensitive receptors. The anticipated noise increase to these off-base areas would not cause unsafe conditions and would not change or conflict with any existing or planned land uses in this area.</p> <p>No significant impacts to land use resources would result from the proposed MOB 3 mission.</p>	<p>Implementation of the proposed MOB 3 mission in conjunction with C-5B to C-5M conversion would result in a net decrease in acres (-396 acres) and estimated residents (-38) exposed to noise levels of 65 dB L_{Adn} or greater.</p> <p>No significant impacts to land use resources would result from the proposed MOB 3 mission.</p>	Under the No Action Alternative, conditions at each base would remain unchanged. No changes would occur to planning noise contours surrounding the bases and no land use changes would occur within the base boundaries.
Infrastructure	Implementation of the proposed MOB 3 mission is not anticipated to result in significant impacts to infrastructure systems (e.g., potable water, wastewater, stormwater, electrical, natural gas, solid waste management, and transportation).				Under the No Action Alternative, baseline conditions at each base would remain unchanged. No new construction would occur and no new personnel would arrive or decrease at any of the bases. No additional impacts to the infrastructure system at any of the bases would occur.

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Hazardous Materials and Waste	The types of hazardous materials and wastes that would be used and generated by the proposed MOB 3 mission are consistent with those currently utilized and generated by the KC-135 mission and other missions at each base; however, the quantities of hazardous materials used and wastes generated would increase with implementation of the proposed MOB 3 mission.			Although the types of hazardous materials used and wastes generated by the proposed MOB 3 mission would increase relative to the current C-5 mission, the types of materials would be similar and hazardous wastes generated would be similar to those currently generated at Westover ARB.	Under the No Action Alternative, conditions at each base would remain unchanged. Each base would continue to use hazardous materials and dispose of hazardous waste as described for each base’s baseline conditions.
	The systems engineering process has eliminated halon and minimized the use of the hazardous materials hexavalent chromium and cadmium. Other hazardous materials (e.g., trichloroethane) have available alternates and would not be required for the KC-46A. The preference would be to use the least hazardous material when alternatives are available. Any structures proposed for upgrade or retrofit would be inspected for asbestos-containing materials (ACM) and lead-based paint (LBP) according to established procedures. Modifications and/or additions to existing buildings would occur in proximity to existing Environmental Restoration Program (ERP) sites. The USAF would coordinate with regulatory agencies for any impacts to monitoring wells and any excavation on or near active ERP sites. Formal construction waivers would not be required, but the USAF would require the review of excavation and/or construction siting and compatibility with environmental cleanup sites to be conducted and documented in accordance with current environmental impact analysis processes. During the design phase for each development project, proximity to the various types of ERP sites would be evaluated to determine if additional costs would need to be included in project estimates to maintain the proper land use controls and the groundwater monitoring well networks, and to incorporate proper health and safety precautions into construction plans.				
Socioeconomics (all numbers are approximated)	<p>Population Overall population increase of 530 full-time mission personnel (not including contractors) and military and DoD civilian dependents (0.7 percent increase in the ROI).</p> <p>Economic Activity Total increase on-base full-time military personnel, DoD civilians, and contractors: 217 (estimated 29 jobs). Total construction costs of \$117.8 million could generate 1,197 jobs and \$11.4 million in indirect and induced income for the duration of the construction activity.</p> <p>Housing The housing market in the ROI and surrounding communities within adjacent counties would be anticipated to support the incoming personnel.</p> <p>Education An estimated 197 military dependents of school-age would enter the school districts in surrounding communities. Based on the number of school corporations and schools in the ROI, as well as class size for the state, the schools in the county would be anticipated to have the capacity to support the incoming population.</p>	<p>Population Overall population increase of 100 full-time mission personnel (not including contractors) and military and DoD civilian dependents to Wayne County (0.08 percent increase in the ROI).</p> <p>Economic Activity Total increase on-base full-time military personnel, DoD civilians, and contractors: 53 (estimated 22 jobs). Total construction costs of \$103.4 million could generate 1,144 jobs and \$13.7 million in indirect and induced income for the duration of the construction activity.</p> <p>Housing Under the assumption that all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 38 off-base housing units.</p> <p>Education An estimated 37 military dependents of school age would be anticipated to enter the Wayne County Public School District.</p>	<p>Population Overall population increase of 769 full-time mission personnel (not including contractors) and military and DoD civilian dependents to Oklahoma County (0.1 percent increase in the ROI).</p> <p>Economic Activity Total increase on-base full-time military personnel, DoD civilians, and contractors: 308 (94 estimated jobs). Total construction costs of \$101 million could generate 968 jobs and \$31.2 million in indirect and induced income for the duration of the construction activity.</p> <p>Housing Assuming all 293 incoming full-time mission personnel would require off-base housing, the housing market in the ROI would be anticipated to support the incoming personnel.</p> <p>Education Approximately 286 military and non-military dependents of school age would enter public school districts in Oklahoma County.</p>	<p>Population Overall population increase of 1,040 full-time mission personnel (not including contractors) and military and DoD civilian dependents to the ROI (0.17 percent increase in the ROI).</p> <p>Economic Activity Total increase on-base full-time military personnel, DoD civilians, and contractors: 411 (estimated 100 jobs). Total construction costs of \$196.9 million could generate 2,137 jobs and \$41.5 million in indirect and induced income for the duration of the construction activity.</p> <p>Housing Assuming all 396 incoming full-time military personnel associated with the MOB 3 mission would require off-base housing, the housing market in the ROI would be anticipated to support the change in personnel.</p> <p>Education Approximately 386 military and non-military dependents of school age would enter public school districts in the ROI.</p>	Under the No Action Alternative, conditions would remain as described in Chapter 3. No new personnel increases or decreases would occur at any of the bases, and none of the bases would receive the benefits of a population increase. No construction would occur, thus no construction-related beneficial expenditures would occur.

Table 2-19. Comparative Summary of Environmental Consequences (Continued)

Resource Area	Grissom ARB	Seymour Johnson AFB	Tinker AFB	Westover ARB	No Action
Socioeconomics (Continued) (all numbers are approximated)	<p>Public Services Demand for public services in the ROI would increase with the projected change in the population; however, it would not be anticipated to result in a significant change due to the small increase in population partially offset with the recent annual decline in population in the ROI.</p> <p>Base Services Several base services would require additional manpower and facilities to accommodate the incoming personnel.</p>	<p>Public Services Public services would be anticipated to support the incoming population.</p> <p>Base Services Base services have adequate capacity in the CDC, housing, fitness, and dining facilities under the existing infrastructure to support replacement of the KC-135 mission with the proposed MOB 3 mission.</p>	<p>Public Services Public services would be anticipated to support the incoming population.</p> <p>Base Services There is adequate infrastructure and capacity to support incoming military populations.</p>	<p>Public Services Public services would be anticipated to support the incoming population.</p> <p>Base Services Several base services would require additional manpower and facilities to accommodate the incoming personnel. No childcare or military dining facilities are available on Westover ARB.</p>	
Environmental Justice and Other Sensitive Receptors	Implementation of the proposed MOB 3 mission is not anticipated to disproportionately impact any off-base minority, low-income, youth, or elderly populations.				Under the No Action Alternative, baseline conditions at each base would remain unchanged. There would be no environmental justice impacts or impacts to youth or elderly populations at any of the bases.

THIS PAGE INTENTIONALLY LEFT BLANK

2.8 MITIGATION

Mitigation measures avoid, minimize, remediate, or compensate for environmental impact. CEQ regulations (40 *CFR* 1508.20) define mitigation to include the following:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action, and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

Avoiding, minimizing, or reducing potential impacts has been a priority guiding the development of the proposed KC-46A MOB 3 mission and aircraft operations. Mitigation measures are either built or designed into the proposed action and alternatives; applied to construction, operation, or maintenance involved in the action; or implemented as compensatory measures. Following the EIS Record of Decision (ROD), a Mitigation Plan will be prepared in accordance with 32 *CFR* 989.22(d). The Mitigation Plan will address specific mitigations identified and agreed to during the Environmental Impact Analysis Process (EIAP).

Given the relative immaturity of the KC-46A program, identification of new data and information relative to the aircraft could arise and it is possible that the impacts identified in the Final EIS may be different from those expected. An understanding of various aspects that are part of a complex interrelated KC-46A operational environment may not be achieved without a more long-term process built around a continuous cycle of evaluation, learning, and improvement over time.

To accommodate this, the Mitigation Plan will identify principal and subordinate organizations having responsibility for oversight and execution of specific mitigation and management actions. The plan will be prepared in accordance with the CEQ mitigation and monitoring guidance.

2.8.1 Measures Proposed to Reduce Potential for Environmental Impacts

Specific mitigation measures are presented in Table 2-20. The table identifies proposed mitigation measures to reduce the potential for environmental impacts. The table presents the mitigation measures by resource area and base.

Table 2-20. Mitigation Measures to Reduce the Potential for Environmental Impacts

Resource Area/Alternative	Mitigations Measures to Reduce the Potential for Environmental Impacts
Acoustic Environment	
All Bases	No base-specific mitigation identified.
Air Quality	
All Bases	No base-specific mitigation identified.
Safety	
All Bases	No base-specific mitigation identified.
Soils and Water	
Grissom ARB	No base-specific mitigation identified.
Seymour Johnson AFB	No base-specific mitigation identified.
Tinker AFB	The proposed 507 ARW ramp expansion would occur within the 500-year floodplain of East Crutch Creek. In order to avoid altering the elevation, function, and capacity of the 500-year floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion.
Westover ARB	No base-specific mitigation identified.
Biological Resources	
Grissom ARB	No base-specific mitigation identified.
Seymour Johnson AFB	No base-specific mitigation identified.
Tinker AFB	No base-specific mitigation identified.
Westover ARB	No base-specific mitigation identified.
Cultural Resources	
Grissom ARB	Consultation with the SHPO is complete. No base-specific mitigation identified.
Seymour Johnson AFB	Consultation with the SHPO is complete. No base-specific mitigation identified.
Tinker AFB	Consultation with the SHPO is complete. Should Tinker AFB be selected to host the MOB 3 mission, an archaeological field inspection of the construction area would be completed prior to construction.
Westover ARB	Consultation with the SHPO is complete. Should Westover ARB be selected to host the MOB 3 mission, the USAF would prepare HABS/HAER recordation of Hangar 7071 and Building 2426 and develop a map that identifies the boundaries of the Westover ARB Historic District. The USAF will invite the MHC to participate in the design review process for the new construction.

Table 2-20. Mitigation Measures to Reduce the Potential for Environmental Impacts (Continued)

Resource Area/Alternative	Mitigations Measures to Reduce the Potential for Environmental Impacts
Land Use	
All Bases	No base-specific mitigation identified.
Infrastructure	
All Bases	No base-specific mitigation identified.
Hazardous Materials and Waste	
All Bases	No base-specific mitigation identified.
Socioeconomics	
All Bases	No base-specific mitigation identified.
Environmental Justice and Protection of Children	
All Bases	No base-specific mitigation identified.

2.9 MANAGEMENT ACTIONS

In addition to mitigation measures, the EIS has identified a series of management actions. These management actions will be implemented in accordance with applicable regulations or USAF guidance. Specific management actions identified in the Draft EIS are presented in Table 2-21. The table presents the management actions by resource area and base.

2.10 UNAVOIDABLE IMPACTS

Potential impacts that could occur and cannot be mitigated include the following:

- The existing capacity of regional landfills would be reduced due to the solid waste generated.
- Although anticipated to be similar in type to what is currently generated or what was recently generated at all four bases, hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with the new aircraft.
- Individual species would be affected by land disturbance and air operations.
- Stormwater runoff and associated erosion would increase due to construction.
- There is potential for an increase in the number of bird/wildlife-aircraft strikes and aircraft mishaps resulting from the increased number of annual operations.

Table 2–21. Management Actions to Reduce the Potential for Environmental Impacts

Resource Area/Alternative	Management Actions to Reduce the Potential for Environmental Impacts
Acoustic Environment	
All Bases	<ul style="list-style-type: none"> KC-46A MOB 3 aircrews would conduct no more than 11 percent of total airfield operations between 10:00 P.M. and 7:00 A.M.
Air Quality	
All Bases	<p>Employ fugitive dust control and soil retention practices including:</p> <ul style="list-style-type: none"> Water trucks to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area. Suspension of all soil disturbance activities when visible dust plumes emanate from the site. Designating personnel to monitor the dust control program and to order increased watering, as necessary, to prevent the transport of dust off-site.
Safety	
All Bases	<ul style="list-style-type: none"> Emergency and mishap response plans would be updated to address the needed procedures and response actions specific to the KC-46A airframe.
Soils and Water	
All Bases	<ul style="list-style-type: none"> Update installation Storm Water Pollution Prevention Plans (SWPPPs), as required by state and federal CWA requirements, to include the new KC-46A building construction. Post construction, all disturbed areas would be re-graded to pre-construction contours. Silt fence, interceptor trenches, hay bales, or other suitable erosion and sediment control measures would be used during construction, and revegetation of disturbed areas will occur as soon as practical.
Grissom ARB	<ul style="list-style-type: none"> No base-specific management actions identified.
Seymour Johnson AFB	<ul style="list-style-type: none"> Upon implementation of the proposed MOB 3 mission, the SWP would be revised to include an evaluation of deicing procedures and ways to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.
Tinker AFB	<ul style="list-style-type: none"> No base-specific management actions identified.
Westover ARB	<ul style="list-style-type: none"> If implementation of the proposed MOB 3 mission at Westover ARB would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, quarterly benchmark water quality monitoring at Outfall 1 would be required to validate compliance with the benchmark monitoring concentrations contained in the base's permit. The quarterly results would be reported to the USEPA. If the sample results exceed the benchmark levels for Biological Oxygen Demand (BOD) [30 milligrams per liter (mg/L)], Chemical Oxygen Demand (COD) (120 mg/L), Ammonia (2.14 mg/L) or pH (6-9), additional controls would require evaluation and possible implementation.

Table 2–21. Management Actions to Reduce the Potential for Environmental Impacts (Continued)

Resource Area/Alternative	Management Actions to Reduce the Potential for Environmental Impacts
Biological Resources	
All Bases	<ul style="list-style-type: none"> • Continue adherence to BASH program.
Cultural Resources	
All Bases	<ul style="list-style-type: none"> • Track results of government-to-government consultation with tribes. • In the case of unanticipated or inadvertent cultural resource discoveries, the USAF would comply with Section 106 of the NHPA and follow the standard operating procedures outlined in the Integrated Cultural Resource Management Plan (ICRMP).
Land Use	
All Bases	<ul style="list-style-type: none"> • Once the full complement of KC-46A aircraft are operating at the MOB 3 base, prepare an update to the current Air Installation Compatible Use Zone Study (AICUZ) to validate operational data and identify projected noise levels based on the most recent noise data.
Infrastructure	
All Bases	<ul style="list-style-type: none"> • Incorporate LEED and sustainable development concepts into construction projects to achieve optimum resource efficiency, sustainability, and energy conservation, except to the extent limited or prohibited by law. • Continue and enhance recycling and reuse programs to accommodate waste generated by the KC-46A beddown.
Hazardous Materials and Waste	
All Bases	<ul style="list-style-type: none"> • Update Hazardous Waste Management Plans to account for any new and/or changed waste streams or new procedures, if any, for managing hazardous materials and wastes associated with KC-46A aircraft. • Review construction plans to identify any monitoring wells that would need to be removed and/or replaced. • Review construction plans to identify any buildings containing toxic substances such as LBP and asbestos.
Socioeconomics	
All Bases	<ul style="list-style-type: none"> • No base-specific management actions identified.
Environmental Justice and Protection of Children	
All Bases	<ul style="list-style-type: none"> • No base-specific management actions identified.

CHAPTER 3

BASE-AFFECTED ENVIRONMENT



3.0 BASE-AFFECTED ENVIRONMENT

This chapter is alphabetically organized by each of the four U.S. Air Force (USAF) installations under consideration for the proposed KC-46A Third Main Operating Base (MOB 3) mission. The baseline or existing condition information, organized by resource area in each of the four base sections, forms the basis for the comparative analysis presented in the summary table at the end of Chapter 2 (Table 2-19). The USAF evaluates and compares operational and economic factors and environmental resources to determine whether to make a beddown decision at this time and, if such a decision is made, where the proposed KC-46A MOB 3 mission would be located. With the exception of Westover Air Reserve Base (ARB), the baseline conditions described in this chapter constitute conditions under the No Action Alternative. The No Action Alternative for Westover ARB includes conversion of the C-5B fleet to the quieter C-5M aircraft (as described in Section 4.5).

The geographic scope of potential consequences, known as a region of influence (ROI), is described for each resource area. For most of the resource areas, the ROI is defined as areas of the base affected by aircraft operations and infrastructure upgrades. For some resources (e.g., acoustic environment, air quality, and socioeconomics), the ROI extends into surrounding communities unique to that specific resource area. See Volume II, Appendix B, for a description of the ROI for each resource area.

The goal in producing this Draft Environmental Impact Statement (EIS) has been to prepare a concise document that addresses the base-specific concerns of individuals, agencies, and others while meeting the comparative needs of the USAF decision makers. Public, agency, and other comments received during scoping were used to focus the analysis on those environmental resources of interest to scoping participants. Certain environmental resources were not carried forward for separate evaluation in this Draft EIS because it was determined that implementation of the proposed KC-46A MOB 3 mission at any of the alternative bases would be unlikely to affect those resources. Airspace management was not evaluated, because no new airspace would be proposed and no changes to the manner in which the existing airspace is used would occur. Visual resources were also not evaluated because implementation of the proposed MOB 3 mission would not affect landscapes and landforms or other features that attribute to landscape-level visually aesthetic qualities. Resource definitions, as well as the regulatory setting and methodology of the analysis, are contained in Volume II, Appendix B.

3.1 GRISSOM AIR RESERVE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Grissom ARB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed MOB 3 mission at Grissom ARB.

3.1.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Information on baseline aircraft operations was provided by USAF installation points-of-contact (POCs) in December 2015. After being processed for input to the computer noise model, the information was re-confirmed and validated by the same USAF personnel in March 2016.

Under baseline conditions, KC-135 aircraft based at Grissom ARB conduct 8,800 airfield operations per year, and military transient aircraft conduct 2,450 airfield operations per year. Civilian aircraft operating at the co-located Grissom Aeroplex conduct 4,618 airfield operations per year. An airfield operation is counted each time an aircraft departs from the runway and each time an aircraft approaches the runway. The A-weighted maximum noise levels (L_{Amax}) in decibels (dB) (see Volume II, Appendix B for description of noise metrics) generated by individual overflights of KC-135 aircraft as well as the most common types of military transient and civilian aircraft users of the Grissom ARB runways are shown in Table 3-1.

Table 3-1. Aircraft Maximum Noise Levels at Grissom ARB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
C-5B	85% NF	104	94	78	65
C-17	1.08 EPR	85	76	64	55
Business jet (Cessna 500)	305 LBS	64	56	46	37
Dual propeller (Cessna 441)	30% RPM	70	62	52	44
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29
Takeoff					
KC-135	90% NF	87	80	69	59
C-5B	4.68 EPR	104	94	79	68
C-17	1.35 EPR	91	83	72	64
Business jet (Cessna 500)	1,554 LBS	76	69	58	49
Dual propeller (Cessna 441)	100% RPM	73	67	58	51
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 434 Air Refueling Wing (ARW) KC-135 aircraft are R models, which are substantially quieter than earlier models.

Key: Power Units: NF = fan speed; EPR = engine pressure ratio; RPM = revolutions per minute; LBS = pounds of thrust.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (°F) and 70 percent relative humidity.

Approximately 19 percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). Approximately 11 percent of military transient aircraft operations and 2 percent of total civilian aircraft operations occur during this time period.

In accordance with current USAF and U.S. Department of Defense (DoD) policies, baseline noise levels reflecting all ongoing aircraft operations were created using NOISEMAP (Version 7.2). NOISEMAP accounts for the effects of topography on noise, and are calculated for an average annual day (i.e., a day with 1/365th of annual operations). Figure 3-1 shows baseline day-night average sound level (L_{Adn}) and also includes the 65 dB L_{Adn} noise contours published in the 2014 Air Installations Compatible Use Zones (AICUZ) report as a point of reference (USAF 2014b). The relatively minor differences between the AICUZ noise contours and the updated baseline noise levels reflects a decreased percent of KC-135 operations flown during acoustic night and an increased number of KC-135 practice approaches per sortie. The effects of these two minor adjustments approximately cancel each other, resulting in minimal net change in L_{Adn} .

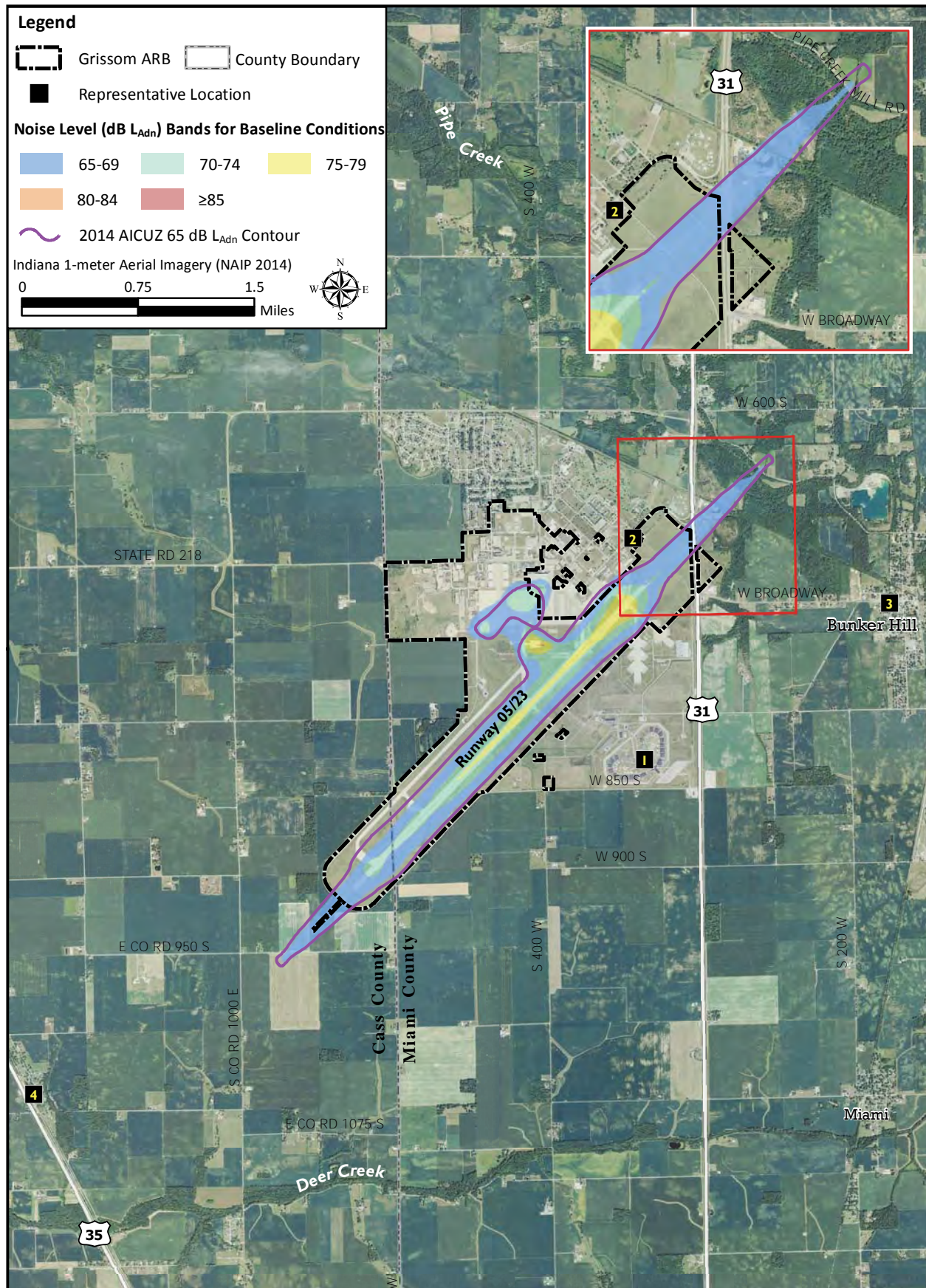


Figure 3-1. Baseline Noise Contours (dB L_{Adn}) at Grissom ARB

Table 3-2 shows the number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} . It is widely accepted that 65 dB L_{Adn} is the noise level at which a substantial percentage of the population can be expected to be annoyed, and this has been accepted by the USAF and several other Federal agencies as the level above which not all noise-sensitive land uses are considered compatible (see Volume II, Appendix B).

Table 3-2. Acres Exposed to Noise Resulting from Baseline Conditions at Grissom ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	320	86	406
70 - 74	204	4	208
75 - 79	67	0	67
80 - 84	0	0	0
≥ 85	0	0	0
Total	591	90	681

Although 90 acres of off-base land are affected by noise levels exceeding 65 dB L_{Adn} , the affected parcels of land are either vacant, owned by government agencies other than the DoD, or being used for non-residential purposes. Based on best-available data, it is estimated that zero off-base residents are currently affected by noise levels greater than or equal to 65 dB L_{Adn} .

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base land at Grissom ARB, and no buildings on Grissom ARB are exposed to noise levels greater than 80 dB L_{Adn} . The risk of hearing loss among workers at Grissom ARB is managed according to DoD regulations for occupational noise exposure. Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) occupational noise exposure regulations are enforced to protect employees of Grissom ARB.

Table 3-3 presents aircraft noise levels at several representative locations surrounding Grissom ARB. The representative locations, which are shown on Figure 3-1, were selected from among many locations that could be considered noise sensitive. All of the locations studied experience baseline noise levels less than 65 dB L_{Adn} , and the land uses at these locations are considered compatible with existing noise levels per recommendations contained in Air Force Instruction (AFI) 32-7063, *AICUZ Program*.

Table 3-3. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Grissom ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Private Dental Office	Less than 45 ^a
2	Church in Town of Bunker Hill	57
3	Miami Correctional Facility	Less than 45
4	Town of Lincoln	61

^a In quiet, small town areas, ambient noise level without aircraft noise is often approximately 45 dB L_{Adn} (USEPA 1974).

Note: Noise levels that are below ambient noise levels are listed as "less than 45."

Grissom ARB Public Affairs received 12 noise complaints from 2012 to 2015. Of the complaints received, 4 were related to aircraft that were either positively identified as KC-135 aircraft or that could have been KC-135 aircraft (Hays 2015). The remaining complaints were related to other aircraft not stationed at Grissom ARB. No noise abatement restrictions exist on flying at Grissom ARB.

3.1.2 Air Quality

Air quality in a given location is defined by the size and topography of the air basin, the local and regional meteorological influences, and the types and concentrations of pollutants in the atmosphere, which are generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare, and include a reasonable margin of safety to protect the more sensitive individuals in the population.

The Clean Air Act (CAA) (42 *United States Code [USC]* 7401–7671[q], as amended) provided the authority for the U.S. Environmental Protection Agency (USEPA) to establish ambient air quality standards to protect public health and welfare nationwide. National Ambient Air Quality Standards (NAAQS) exist for the following criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (less than or equal to 10 micrometers in diameter (PM_{10}) and less than or equal to 2.5 micrometers in diameter ($\text{PM}_{2.5}$), and lead. The NAAQS are listed in Volume II, Appendix B, Section B.2.1.

The CAA establishes air quality regulations and the NAAQS, and delegates the enforcement of these standards to the states. The CAA requires areas in nonattainment of an NAAQS to develop a State Implementation Plan (SIP) that details how the state will attain the standard within mandated timeframes. The requirements and compliance dates for attainment are based on the nonattainment classification of the area.

CAA Section 176(c) and USEPA's General Conformity Rule generally prohibit Federal agencies from engaging in, supporting, permitting, or approving any activity that does not conform to the most recent USEPA-approved SIP in nonattainment or maintenance areas. This means that Federal projects in such areas or other activities using Federal funds or requiring Federal approval (1) will not cause or contribute to any new violation of an NAAQS; (2) will not increase the frequency or severity of any existing violation; or (3) will not delay the timely attainment of any standard, interim emission reduction, or other milestone. The General Conformity Rule applies to Federal actions affecting areas that are in nonattainment of a NAAQS or are designated maintenance areas (former nonattainment areas that have attained the NAAQS). Conformity requirements only apply to nonattainment and maintenance pollutants and their precursor emissions. Conformity determinations are required when the annual direct and indirect emissions from a proposed Federal action equal or exceed an applicable de minimis threshold. These thresholds are lower for more severe nonattainment conditions. Because Miami and Cass Counties currently attain all of the NAAQS, the General Conformity Rule would not apply to the proposed KC-46A MOB 3 mission at Grissom ARB.

Hazardous air pollutants (HAPs) are air pollutants known or suspected to cause serious health effects (e.g., birth defects or cancer) or adverse environmental effects. HAPs are compounds that generally have no established ambient standards. The CAA amendments identify 187 substances as HAPs (e.g., benzene, formaldehyde, mercury, and toluene). HAPs are emitted from a range of

industrial facilities and vehicles, such as aircraft. The USEPA sets Federal regulations to reduce HAP emissions from stationary sources. A “major” source of HAPs under the Federal Title V Operating Program is defined as any stationary facility or source that directly emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of combined HAPs.

In Indiana, the Indiana Department of Environmental Management (IDEM) Office of Air Quality (OAQ) is responsible for enforcing air pollution regulations. The OAQ enforces the NAAQS by monitoring state-wide air quality and developing rules to regulate air emissions and permit stationary emission sources. The Indiana Air Pollution Control Rules are contained in the *Indiana Administrative Code* Title 326 (Air Pollution Control Division) (IDEM 2016).

Greenhouse gases (GHGs) trap heat in the atmosphere. Both natural processes and human activities generate these emissions. The accumulation of GHGs in the atmosphere effects regulation of the earth’s temperature. Volume II, Appendix B, Section B.2.1.1, describes recent conditions regarding climate change and impacts on the United States, as described in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014).

GHGs include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide, O₃, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its lifetime and ability to trap heat in the atmosphere. The GWP rating system is standardized to carbon dioxide, which has a value of one. For example, methane has a GWP of 28, which means that it has a global warming effect 28 times greater than carbon dioxide on an equal-mass basis (IPCC 2013). To simplify GHG analyses, total GHG emissions from a source are often expressed as a carbon dioxide equivalent (CO₂e). The CO₂e is calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While methane and nitrous oxide have much higher GWPs than carbon dioxide, carbon dioxide is emitted in such great quantities that it is the overwhelming contributor to global CO₂e emissions from both natural processes and human activities.

Given the global nature of climate change and the current state of the science, it is not useful at this time to attempt to link the emissions resulting from local actions to any specific climatological change or resulting environmental impact. Nonetheless, GHG emissions resulting from implementation of the proposed KC-46A MOB 3 mission have been quantified to the extent feasible in this Draft EIS for information and comparison purposes.

3.1.2.1 Region of Influence and Existing Air Quality

Air emissions produced from construction and operation of the proposed KC-46A MOB 3 mission at Grissom ARB would mainly affect air quality within Miami County and, to a lesser extent, Cass County, as the end of Runway 05 at Grissom ARB extends into the eastern portion of Cass County. Identifying the ROI for air quality requires knowledge of the pollutant type, source emission rates, the proximity of project emission sources to other emission sources, and local and regional meteorology. For inert pollutants (e.g., CO and particulates in the form of dust), the focus of the analysis or the ROI is generally limited to a few miles downwind from a source. The ROI for reactive pollutants such as O₃ may extend much farther downwind than for inert pollutants. Ozone is formed in the atmosphere by photochemical reactions of previously emitted pollutants called precursors. Ozone precursors are mainly oxides of nitrogen (NO_x) and photochemically reactive volatile organic compounds (VOCs). In the presence of solar radiation, the maximum effect of precursor emissions on O₃ levels usually occurs several hours after they are emitted and many miles from their source. Currently, Miami and Cass Counties attain all of the NAAQS (USEPA 2016a).

3.1.2.1.1 Regional Air Emissions

Emissions for Miami County are used to describe the air emissions within the project region, as all administrative and source activities at Grissom ARB originate within this county. Table 3-4 summarizes annual emissions data developed for Miami County in 2011 as part of the National Emissions Inventory (NEI) process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages (VOCs), and (3) fugitive dust (PM₁₀/PM_{2.5}).

Table 3-4. Annual Emissions for Miami County, Indiana, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Stationary Sources	1,169	1,174	158	45	5,510	1,020	NA
Mobile Sources	729	6,746	1,542	7	91	63	303,044
Total	1,898	7,920	1,700	52	5,601	1,083	303,044^a

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Miami County are incomplete.

Key: SO_x – sulfur oxides; CO₂e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

Source: USEPA 2016b

3.1.2.1.2 Grissom ARB Emissions

Operational emissions due to existing operations at Grissom ARB occur from (1) aircraft operations and engine maintenance/testing, (2) aerospace ground equipment (AGE), (3) onsite government motor vehicles (GMVs) and privately owned vehicles (POVs), (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-5 summarizes estimates of the most recent (2015) annual operational emissions generated by the KC-135 434th Air Refueling Wing (ARW) at Grissom ARB. These data were developed in part from mobile source activity data and stationary source emissions found in the *2002 Air Emissions Inventory (Stationary and Mobile Sources) – Grissom Air Reserve Base* (Grissom ARB 2003) and from activity data collected for 2015 operations.

Table 3-5. Annual Emissions from Existing Operations of the 434 ARW at Grissom ARB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC-135 Aircraft Operations	4.71	80.30	186.86	16.57	0.90	0.90	46,163
On-Wing Aircraft Engine Testing – KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,200
AGE	0.07	0.39	0.42	0.00	0.06	0.06	65
GMVs	0.06	1.20	0.25	0.00	0.02	0.01	108
POVs – On Base	0.04	1.06	0.16	0.00	0.02	0.00	90
POVs – Off Base	0.31	11.42	1.95	0.02	0.11	0.04	942
Point and Area Sources	0.35	0.14	0.43	0.02	0.04	0.03	NA
Total Emissions^a	6.60	109.90	196.02	17.40	1.19	1.08	49,567

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Miami County are incomplete.

Key: SO_x – sulfur oxides; CO₂e (mt) – carbon dioxide equivalent in metric tons

Because KC-135 on-wing testing emission data were not available for Grissom ARB, emission data from KC-135 maintenance activities at Fairchild Air Force Base (AFB) were used on a per-aircraft basis for activities at Grissom ARB (AFCEC 2014a). Emission data from the usage of AGE by the 434 ARW were also not available and are thus based on a per-aircraft usage of AGE by KC-135 aircraft at Seymour Johnson AFB (Zapata Inc. and URS Group, Inc. 2015). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.1.1, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from existing sources at Grissom ARB.

3.1.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with operations and maintenance (O&M) activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.1.3.1 Flight Safety

Aircraft flight operations at Grissom ARB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. In the past 10 years (2004–2014), there was only one Class A mishap at Grissom ARB. That mishap did not involve an aircraft crash or result in the loss of an aircraft. There have been five reported Class B mishaps during the past 10 years. Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of \$2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between \$500,000 and up to \$2 million.

The KC-135 and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is Air Force Reserve Command (AFRC) policy to follow AFIs that have been established to avoid fuel jettison, unless safety of flight dictates immediate jettison. Air Mobility Command (AMC) policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet above ground level (AGL) (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events

(Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.1.3.1.1 Wildlife Strike Hazard at Grissom ARB and Vicinity

A bird/wildlife-aircraft strike hazard exists at and in the vicinity of Grissom ARB due to resident and migratory bird species. Grissom ARB is located in close proximity to several major duck and goose migration corridors (Grissom ARB 2011). The duck corridors, located south of the base, experience populations of between 50,000 and 750,000 ducks per year flying through the area. The goose corridors, located east and west of the base, experience populations of 5,000 to 300,000 geese per year flying through the area. Daily and seasonal bird movements create various hazardous conditions. Measures can be taken that reduce the potential for and the number of potentially hazardous bird strikes by aircraft at or near Grissom ARB. Such actions prevent damage to aircraft and preserve lives and valuable resources. In addition to the bird species, mammals (e.g., rabbits, hares, and occasionally coyotes) wander onto the airfield and become strike hazards.

The Grissom ARB Bird-Aircraft Strike Hazard (BASH) Plan establishes procedures to minimize this hazard, including the removal or control of bird attractants, as well as depredation methods such as bird hunts (Grissom ARB 2010a). The adopted BASH Plan establishes implementation procedures and actions that can be taken to minimize the potential of bird-aircraft strikes. Such measures include eliminating broad-leaf weeds, maintaining grass heights between 7 and 14 inches, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding (insects are a major food source for birds during much of the year). BASH reduction techniques currently employed by the base include abating nuisance avian species by using pyrotechnics, and depredation when necessary. Grissom ARB has been granted a U.S. Fish and Wildlife Service (USFWS) Depredation Permit to lessen the danger of bird strikes. The depredation permit is managed by the safety office at Grissom ARB.

The 434 ARW has the responsibility to implement the approved BASH Plan. The BASH Plan also establishes the Bird Hazard Working Group, composed of representatives of Flight Safety, Civil Engineering, Airfield Management/Base Operations, Air Traffic Control (ATC), Operations, and other concerned organizations. Between 2010 and 2014, Grissom ARB personnel recorded 176 bird strikes in the airfield and airspace.

3.1.3.2 *Ground Safety*

Grissom ARB, the Cities of Peru and Kokomo, the Town of Bunker Hill, and Miami and Cass Counties work collaboratively to protect the health and welfare of people living and working in this area while also protecting the military mission at Grissom ARB. Clear Zones (CZs) and Accident Potential Zones (APZs) have been established at military airfields to delineate recommended surrounding land uses for the protection of people and property on the ground. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2014 AICUZ Study (USAF 2014b). All of the CZs for Runway 05/23 at Grissom ARB overlie government property or open/agricultural/low-density/transportation properties.

Montgomery Aviation and Miami County have waived facilities inside the CZ of Runway 23. U.S. Highway 31 (U.S. 31) (permissible deviation) also passes through the CZ of Runway 23. A county road (permissible deviation) penetrates the CZ of Runway 05. APZs I and II extend off

base to the northeast and southwest of Runway 05/23 and include a few low-density residential structures scattered on agricultural property.

Capability for fire response is located on base and in the local communities. The base fire department is party to mutual-aid support agreements with three municipal fire departments (Peru, Kokomo, and Logansport) and six volunteer fire departments (Amboy, Denver, Galveston, New Harmony, Pipe Creek, and Walton).

3.1.4 Soils and Water

3.1.4.1 Soil Resources

Grissom ARB is located on the northern edge of the Tipton Till Plain Section. The area surrounding the base is relatively flat and gently rolling, with elevations ranging from about 780 feet above mean sea level (AMSL) near the north end of the base to about 810 feet AMSL near the south end of the base (Grissom ARB 2011). Soil underlying the base is primarily of the Fincastle-Brookston-Miamian association (IndianaMap 2016). The Fincastle-Brookston-Miamian soils are derived from glacial till and some wind-blown loess that was deposited 12,000 years ago. This area is dissected by stream channels that separate individual flat upland areas (Whitaker and Amlaner 2012).

Primary soil series within the Fincastle-Brookston-Miamian association are the Fincastle silt loam and the Treaty silt loam. These soil types consist of deep, nearly level, poorly drained, medium-textured soils. The Fincastle soils, located on the higher grounds of the base, have a high water capacity, moderately slow permeability, slow surface runoff, and a water table at 1 to 3 feet in winter and spring. Slopes range from 0 to 2 percent. Treaty silt loam soils are located in small, shallow depressions and narrow drainages. These soils have a high water capacity, moderate permeability, very slow surface runoff, and a water table between the surface and a depth of one foot throughout most of the year. Frost heaving, a high water table, and moderate permeability restrict downward movement of roots and water within the Treaty soils. Both of these soils have a slight erosion potential (Grissom ARB 2011).

3.1.4.2 Water Resources

3.1.4.2.1 Surface Water

Grissom ARB is located within the Upper Wabash Watershed, which represents the headwaters of the Wabash River. The Wabash River is located approximately 6 miles north of the base (NRCS 2007). Surface water features in the vicinity of the base include McDowell Ditch, Government Ditch, Cline Ditch, Bennett-Campbell Ditch, Pipe Creek, Little Deer Creek, a lime settling pond located northeast of the cantonment zone, a stormwater retention pond located near the Marine Building/Washrack Complex, and a storm water retention pond located near the base Civil Engineer Complex (Grissom ARB 2014c). There are no naturally-occurring water bodies at the base. Surface drainage from the base flows in a northern and western direction into Pipe Creek, which is a tributary of the Wabash River (Grissom ARB 2011).

A system of storm sewers and ditches collect stormwater at Grissom ARB. Stormwater is discharged off the installation through six outfalls. The western portion of the cantonment area, except for the southwestern portion of the runway, discharges to McDowell Ditch, which flows into Pipe Creek and ultimately into the Wabash River. Stormwater is collected through the other five outfalls from various areas on base, all of which also flow into Pipe Creek. The outfalls are visually inspected on a quarterly basis.

In 2004, the base conducted a stormwater capacity analysis to determine the capacity of the stormwater system at Grissom ARB. The results were summarized by drainage area. For the McDowell Ditch drainage area, the study concluded that the existing structures are able to convey the peak flows from the 10-year/24-hour storm event, but not from the 100-year storm event; minor flooding would result. The study also concluded that Outfall 001 is restricting flow, creating backwater that overflows into the housing area north of the base. The stormwater capacity analysis showed that 36.5 percent of the pipes on base were inadequate for the 10-year storm event. The report further concluded that the pipe system near the southwest end of the runway is not draining as originally designed (USAF 2004).

The IDEM issued a general National Pollution Discharge Elimination System (NPDES) Permit for stormwater discharges associated with industrial activity on 22 June 2014, which expires on 22 June 2019 (Permit Number INRM00746). The General Permit requires an annual report and sampling at four outfalls. Analytical results from current grab samples and a comparison of these sample results to the other results from within the permit years are included in each report. The grab samples are collected from Outfalls 001, 002, 003, and 005. They are sampled for: oil & grease, carbonaceous biochemical oxygen demand (CBOD₅), chemical oxygen demand (COD), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), total phosphorus, pH, nitrate plus nitrite nitrogen, propylene glycol, and potassium. Rule 6 requires that “any pollutant that has the potential to be present in the storm water discharge” also be sampled. Potassium acetate and propylene glycol have been identified as potential pollutants and added to the list (Grissom ARB 2014c).

Several pollutants could be present in the stormwater at the base and potentially enter waters of the state. These pollutants are detergents/soaps, glycols, oil and grease, miscellaneous solvents, and various hazardous constituents of fuels used at the base (i.e., benzene, toluene, xylene, cyclohexane, ethylbenzene, and naphthalene). The application of deicing fluids to aircraft during conditions of snow and freezing rain generates runoff laden with deicing fluids. The deicing fluid used at the base is propylene glycol, which is applied in a diluted form, generally 50/50 percent with water. The deicing runoff is further diluted due to the mixing with precipitation and snow melt runoff. At Grissom ARB, deicing is accomplished at two primary locations on the Southwest portion of the ramp. Spent deicing fluid is collected into a designated collection system. The collection system pumps the spent deicing fluid into designated tanks. When the tanks are full, the fluid is recycled or properly disposed of. The quantity of propylene glycol used at the base is approximately 13,000 gallons annually.

The primary environmental concern regarding aircraft deicing is the effect that spent deicing runoff has on surface water quality. Deicing compounds, because of their organic nature, exert a high biological oxygen demand (BOD) on receiving streams, which depletes oxygen levels necessary to sustain aquatic life. In addition, the aprons, taxiways, and runways at the base are deiced/anti-iced with potassium acetate throughout the winter.

3.1.4.2.2 Groundwater

The principle aquifer underlying Grissom ARB is in the Liston Creek Limestone formation, which is part of the Silurian and Devonian Carbonates Aquifer System (Unterreiner 2007). Wells penetrating the Silurian and Devonian Carbonates Aquifer System in Miami County range from 35 to 500 feet deep, but are commonly 80 to 170 feet deep. Wells completed in the Silurian and Devonian Carbonates Aquifer System are capable of meeting the needs of domestic and some high-capacity users in Miami County. Static water levels typically range from 15 to 60 feet below ground surface (bgs), with a few reports of flowing wells in the county. There are nine registered large ground-water withdrawal facilities (25 wells) using the Silurian and Devonian

Carbonates Aquifer System in Miami County, with reported high-capacity well yields ranging from 76 to 950 gallons per minute (GPM) (Unterreiner 2007). The dominant use for these facilities is public water supply. This aquifer system is generally not very susceptible to surface contamination due to thick clay deposits over most of the county. However, areas where overlying clays are thin or absent are at moderate to high risk for contamination.

Institutional controls associated with Environmental Restoration Program (ERP) sites at Grissom ARB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.1.4.2.3 Floodplains

Although the 2004 stormwater capacity analysis documented that flooding could occur at various areas on Grissom ARB, no Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) have been prepared for the base. Although the FIRM for areas north of the base and outside of the installation boundary indicates floodplains associated with Pipe Creek, no other floodplains are identified near the base (See Figure 3-2).

A geographic information system (GIS) analysis was performed using the FEMA FIRM 100-year base floodplain elevations for Pipe Creek. In compliance with Executive Order (EO) 13690, an additional three feet was added to those elevations to identify the locations of areas that have an elevation of three feet above the 100-year floodplain. These locations were then plotted using a digital elevation model to identify areas near the existing 100-year floodplain that were greater than the 100-year floodplain base elevations and less than or equal to the 100-year plus 3 feet elevation. The results are shown on Figure 3-2.

3.1.5 Biological Resources

3.1.5.1 *Vegetation*

Grissom ARB lies within the Central Till Plain Natural Region and the Beech-Maple Forest Section of the Eastern Deciduous Forest Province. Vegetation associated with this ecoregion is characterized by temperate deciduous forests dominated by tall, broadleaf trees. The area that is now Grissom ARB was originally a mixed hardwood forest that was logged and cleared for agricultural uses (e.g., row crops, small grains, forage grasses, and pasture) during the 1800s. Historical farming and urban development have resulted in limited remaining forests in the vicinity of the base (Grissom ARB 2011).

Most of Grissom ARB is now urbanized, and the original vegetation has been removed or extensively altered by development, construction, landscaping, and other disturbances. Turf grasses and various broad-leaf weeds comprise the predominate vegetation types within improved and semi-improved areas on the base (Volume II, Appendix E). Vegetation management at Grissom ARB is guided by the Integrated Natural Resource Management Plan (INRMP), the Land Use Management Plan, and the BASH Plan (Grissom ARB 2008, 2010a, 2011).

3.1.5.2 *Wildlife*

Information on wildlife occurring on Grissom ARB is provided in the INRMP (Grissom ARB 2011). Common wildlife documented on the base includes a wide variety of mammals, birds, amphibians, and reptiles. Very few fish species are present within the base's drainage ways and consist mainly of several minnow species. See Appendix E for a partial list of common species that occur at Grissom ARB.



Figure 3-2. Grissom ARB Water Resources

3.1.5.3 Special-Status Species

Two USFWS online review sources (the Information for Planning and Conservation [IPaC] and Environmental Conservation Online System [ECOS]) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Grissom ARB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the Endangered Species Act [ESA], inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Grissom ARB. Separate submissions were completed for Cass and Miami Counties to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 25 March 2016 (Volume II, Appendix A, Section A.6.1.1) contains a full copy of the Trust Resource Report (USFWS 2016b). Additionally, special status species lists by county were obtained via the USFWS's ECOS to identify species with the potential to occur within Cass and Miami Counties, Indiana (USFWS 2016c). Table 3-6 presents the federally listed species identified through the IPaC and ECOS reviews, as having the potential to occur within Cass and/or Miami Counties.

Table 3-6. Federally Listed Species that Could Occur in Cass and Miami Counties, Indiana

Common Name	Scientific Name	Status		Occurrence at Grissom ARB	USFWS Online Review System
		Federal ^a	State ^b		
Clams					
Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	FT	SE	No	IPaC, ECOS
Sheepnose mussel	<i>Plethobasus cyphus</i>	FE	-	No	IPaC, ECOS
Mammals					
Indiana bat	<i>Myotis sodalis</i>	FE	SE	No	IPaC, ECOS
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT	SC	No	IPaC, ECOS

^a USFWS

^b Indiana Department of Natural Resources (IDNR)

Key: FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; SC – Indiana State-listed as a species of special concern; SE – Indiana State-listed as endangered

Source: Grissom ARB 2011; USFWS 2015c, d, e, g, 2016b, c; IDNR 2013a, b

No federally or state-listed species are known to inhabit Grissom ARB; however, avian species protected under the Migratory Bird Treaty Act (MBTA) may occur as residents or migrants near the installation. There is no critical habitat on the base (USFWS 2015a).

No aquatic habitat for the rabbitsfoot (*Quadrula cylindrica cylindrica*) or sheepnose mussel (*Plethobasus cyphus*) occurs on base. Additionally, due to the urbanized and developed nature of land on and surrounding Grissom ARB, there is a lack of suitable roost or foraging habitat for both the Indiana and northern long-eared bat species.

In a letter dated 15 April 2016, the USFWS identified the upland sandpiper (*Bartramia longicauda*), a federal species of conservation concern and Indiana State endangered species, as a successful nesting grassland bird at Grissom ARB (see Volume II, Appendix A, Section A.6.2). Additionally, the USFWS identified the following grassland and shrubland species of conservation concern as successful nesting birds on Grissom ARB: bobolink (*Dolichonyx oryzivorus*), brown thrasher (*Toxostoma rufum*), dickcissel (*Spiza americana*), field sparrow (*Spizella pusilla*), eastern meadowlark (*Sturnella magna*), and grasshopper sparrow (*Ammodramus savannarum*). In July 2015, another federal species of conservation concern and Indiana State endangered species,

the northern harrier (*Circus cyaneus*), was observed soaring at Grissom ARB. However, this species forages over large areas, and breeding has not been confirmed at the base.

In a letter dated 4 April 2016, the Indiana Department of Natural Resources (IDNR) identified two Indiana State species of special concern within a half a mile northeast of Grissom ARB: the American badger (*Taxidea taxus*) and the kidneyshell (*Ptychobranhus greenii*) freshwater mussel (see Volume II, Appendix A, Section A.6.3). American badgers are a wide ranging species that prefer open prairie habitat.

3.1.5.4 Wetlands

A base-wide wetlands identification and delineation survey was conducted at Grissom ARB in July 1997. Seven wetlands were identified, totaling approximately two acres, and were field-confirmed by the U.S. Army Corps of Engineers (USACE) Louisville District. Wetlands present on base are located in two distinct areas, to the west and northeast of Runway 05/23. None of the wetlands present on Grissom ARB are near the facilities and infrastructure projects as described in Chapter 2. The locations of the Jurisdictional Waters and Wetlands on Grissom ARB are shown on Figure 3-2 (Grissom ARB 2011).

3.1.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the National Register of Historic Places (NRHP) are known as historic properties.

3.1.6.1 Architectural Resources

Several cultural resource studies have been conducted at Grissom ARB. Based on the results of these studies Grissom ARB determined that no architectural resources were eligible for listing on the NRHP. The Indiana State Historic Preservation Office (SHPO) concurred with this determination (see letter dated 25 July 2012 in Volume II, Appendix A, Section A.4).

3.1.6.2 Archaeological Resources

Grissom ARB has determined that there are no NRHP-eligible archaeological resources on the base. The SHPO concurred with this finding and confirmed that no further surveys are required at the installation (see letter dated 25 July 2012 in Volume II, Appendix A, Section A.4).

3.1.6.3 Traditional Resources

Pursuant to Sections 101(d)(6)(B) and 106 of the National Historic Preservation Act (NHPA) and implementing regulations at 36 *Code of Federal Regulations (CFR)* Section 800.2(c)(2), the USAF is consulting on a government-to-government basis with 10 tribes that are culturally affiliated with the installation. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, have been asked to provide information on any properties to which they attach religious and cultural significance. The USAF will use this information to determine whether any such resources are eligible for the NRHP, and, if so, identify measures that can be taken to resolve any adverse effects on them.

3.1.7 Land Use

Grissom ARB is located in a rural area of Miami and Cass Counties in north-central Indiana, between the cities of Peru and Kokomo. Grissom ARB operates in association with the Grissom Aeroplex, which provides general aviation and charter service. Land use surrounding the base is predominantly agricultural.

3.1.7.1 Base

Grissom ARB is not one contiguous installation. A number of small parcels exist outside of the main base boundaries. The main cantonment is located north of Runway 05/23. A large portion of the base surrounding the runway and to the west of the cantonment is classified as open space. The primary functional land use on the installation is categorized as Airfield Pavement, which includes the runways, taxiway, and aprons. Limited commercial and community functions exist on base (Grissom ARB 2014d).

Grissom ARB is divided into planning districts based on geographical features, land-use patterns, building types, transportation networks, and mission and/or functional uses. The planning districts at Grissom ARB include an Airfield District, Flightline District, Mission Support District, and Training Area District (Grissom ARB 2014d).

3.1.7.2 Surrounding Areas

The predominant land use surrounding Grissom ARB is agricultural, with the exception of local towns and cities and portions of U.S. 31. Land uses in the local communities, (e.g., Peru, Walton, Galveston, Bunker Hill, and Logansport) and unincorporated communities (e.g., Lincoln, Onward, and Nead) consist primarily of low-density residential property, along with some commercial and industrial property (USAF 2014b).

Adjacent to the airfield, on the northwestern side, is a beech and maple forest conservation area and a residential area, which was part of former base housing. North of the base are residential areas, an elementary school, primarily used by the base, an air museum, a trailer park, and an Indiana Bell office. Public/recreational land uses associated with Pipe Creek also exist on the northern side of the base. The eastern side of the base is more developed and includes residential uses; commercial establishments such as a restaurant, RV sales, and a gas station. The Miami Correctional Facility is located south of the installation on a portion of the former base. Industrial areas are intermixed with agricultural land uses.

Grissom ARB prepared an AICUZ study in 1995. The 1995 AICUZ study was updated in 2014 to present a description of the current noise environment around Grissom ARB. The changes in the updated AICUZ study were based on changes in assigned and transient aircraft operations, and on profiles and modifications to the DoD-approved noise modeling software program (USAF 2014b).

The estimated current off-base area affected by noise levels of 65 dB $L_{A_{dn}}$ or greater is 90 acres (see Section 3.1.1.1). This land consists primarily of open-space/agricultural/low-density property (59 acres). There are 13 acres of industrial land north of the installation and 7 acres of commercial property to the northeast. There is no off-base property within the 75 dB $L_{A_{dn}}$ or greater noise zones.

Miami County is currently in the process of developing a new Comprehensive Plan (Miami County 2015). The current plan was completed in 1999. The Miami County 1999 Master Plan included a policy related to airport noise impacts. The Plan affirmed support for the efforts of

the Grissom Redevelopment Authority concerning land use and development criteria in areas that are impacted by airport noise. Specifically, the Plan supported Grissom Redevelopment Authority's criteria that discouraged incompatible land uses at Grissom Aeroplex (USAF 2014b).

The *Cass County Comprehensive Plan* was adopted in July 2009. It does not serve as a development ordinance, but rather as a growth management guide for unincorporated areas of the county (Cass County 2009). This plan provides an analysis of existing development patterns and a public participation program. It also contains the vision, goals, policies, and an implementation program. The community assessment within the *Comprehensive Plan* provides an analysis of existing development patterns within the county. Miami and Cass County and Grissom ARB are currently discussing a Joint Land Use Study (JLUS). Initiation of this study is contingent on federal USAF funding.

3.1.8 Infrastructure

3.1.8.1 Potable Water System

Potable water is provided to Grissom ARB by Peru Utilities via four wells with a combined pumping capacity of 2.2 million gallons per day (MGD) (Grissom ARB 2014d). Grissom ARB has a contract with Peru Utilities to provide a maximum of 0.8 MGD of potable water. The average water use for 2014 at Grissom ARB was 23,000 gallons per day (GPD) (Grissom ARB 2015b). This is approximately 3 percent of the provider's contracted available water supply and 1 percent of overall capacity.

3.1.8.2 Wastewater

Wastewater generated at Grissom ARB is delivered to the sewage treatment plant owned and operated by Peru Utilities. The treatment plant offers primary and secondary treatment processes and has a permitted treatment capacity of 1.75 MGD. Once treated, the plant's effluent is released into Pipe Creek. Historically, the average flow is 30,000 GPD. This flow increases to 215,000 GPD during heavy precipitation events, because of system infiltration. Peru Utilities allows a maximum capacity of 300,000 GPD for this system (Grissom ARB 2014d).

3.1.8.3 Stormwater System

Grissom ARB's drainage system consists of collecting inlets, headwalls, and circular and elliptical culverts that guide stormwater through a combination of paved and unpaved ditches and natural drainages. The underground piping network for the installation consists of corrugated steel pipe and concrete, and reinforced concrete pipes. The wide range of construction materials is indicative of system upgrades and extension projects that have occurred over time.

3.1.8.4 Electrical System

Miami-Cass County Rural Electric Membership Cooperative (REMC) supplies power to the base through a double-end, 69-kilovolt (kV) overhead transmission line. These lines are the Wabash Line and the Walton Line. Either line can supply transformers at the base's substation. A manual switch is located at the substation in case one of the lines fails. The base's main substation is owned and operated by the Miami-Cass County REMC, and is rated at 7.5 megavolts-ampere (mVA). The transformers are fan-cooled, increasing the overall capacity to 10.5 mVA for a maximum of 4 continuous hours. Oil circuit breakers and fuses protect the transformers from overload (Grissom ARB 2014d). The Miami-Cass County REMC has the capacity to provide 11.5 megawatts (MW). The average electric use in 2014 was 1.5 MW. Peak electric demand in

2014 was 2.44 MW. Grissom ARB averaged approximately 13 percent usage of the electricity provider's daily generation capacity, with 21 percent during peak periods (Grissom ARB 2015b).

3.1.8.5 Natural Gas System

Northern Indiana Public Service Company (NIPSCO) provides natural gas to Grissom ARB through a 12-inch polyethylene gas main, which enters the base near the main gate. Natural gas is then distributed via a limited-access, looped main system. The system currently operates at a standard 50 pounds per square inch (psi) with a maximum capacity of 100 psi. Grissom ARB maintains ownership and maintenance of the distribution system. The distribution system consists of a network of underground gas mains ranging from 3 to 8 inches in diameter. Expansion of the system would require enlarging these primary mains to accommodate increased capacity (Grissom ARB 2014d). NIPSCO has set a natural gas supply limit of 167,000 cubic feet (CF) per hour. Capacity and supply are reported to be sufficient for current and future mission requirements. The base natural gas system has a design capacity to provide 4,008 thousand cubic feet (Mcf) per day. The average natural gas use in 2014 at Grissom ARB was 186 Mcf per day. In 2014 Grissom ARB used approximately 5 percent of the provider's average daily capacity (Grissom ARB 2015b).

3.1.8.6 Solid Waste Management

Waste Management of Central Indiana handles collection, transportation, and disposal of municipal solid waste (MSW). Waste Management disposes of MSW in the Cass County-Oakridge Landfill. Grissom ARB averages between 200 and 250 tons of nonhazardous MSW per year, not including construction and demolition (C&D) waste (Woodring 2016a). Approximately 64 percent of the generated waste stream consists of wastes that are recyclable. C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal (Grissom ARB 2002). The Cass County-Oakridge Landfill has more than 2,000,000 cubic yards of capacity (IDEM 2014).

3.1.8.7 Transportation

Regional access to Grissom ARB is provided from the north and south by U.S. 31 and from the east and west by State Highway 218. The nearest interstate highways are Interstate (I)-70, which extends east-west, approximately 50 miles to the south, and I-69, which extends north-south, approximately 35 miles to the east. Figure 2-2 displays the primary routes and regional transportation network in the vicinity of Grissom ARB. In 2011, U.S. 31 had an average daily traffic count of 18,564 vehicles (IN DOT 2011). U.S. 31 is currently undergoing improvements between Indianapolis and South Bend, Indiana, to turn the road into a stoplight-free highway (U.S. 31 Coalition 2016).

3.1.8.7.1 Gate Access

The two primary gates at Grissom ARB are the Main Gate and the West Gate. The Main Gate is at the intersection of Hoosier Boulevard and Harry Foreman Drive; it is the primary access point onto the installation. The West Gate provides limited access on unit training weekends and for other large installation events (Grissom ARB 2014d).

3.1.8.7.2 On-Base Traffic Circulation

The installation transportation network is an integrated system of roadways, parking areas, and pedestrian pathways. The roadways at Grissom ARB provide uninterrupted connections to base operations. Hoosier Boulevard is the primary roadway; it begins at U.S. 31 (Grissom ARB 2014d).

3.1.9 Hazardous Materials and Waste

3.1.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Grissom ARB are managed in accordance with AFI 32-7086, “Hazardous Materials Management,” and Grissom ARB Supplement, and are controlled through the base Hazardous Materials Pharmacy (HAZMART). The HAZMART process ensures hazardous materials purchased and approved through the supply system are tracked and reutilized to the maximum extent possible before being declared a waste. Grissom ARB performs annual inspections of each shop to ensure proper management and use of hazardous materials (Grissom ARB 2014a).

As part of the overall Pollution Prevention (P2) program at Grissom ARB, the HAZMART provides centralized management and control of hazardous materials (AFRC 1998). The purpose of the P2 program is to reduce or eliminate the use of hazardous and toxic substances and harmful discharges to the air, land, and water. P2 measures minimize chemical exposure to employees, reduce potential environmental impacts, and reduce costs for material purchasing and waste disposal.

3.1.9.1.1 Aboveground and Underground Storage Tanks

Bulk Jet-A fuel is stored in three aboveground storage tanks (ASTs) in the bulk fuel storage area at Grissom ARB. The capacity of the three ASTs is 1,680,204 gallons. Fuel consumption over the past 3 years has been approximately 14,000,000 gallons (LaBahn 2015). The existing Type II jet fuel hydrant system is being replaced with a new Type III hydrant system and primary feed line from the bulk fuel storage area in 2016. The new system will be rated at 1,800 GPM.

Grissom ARB manages spills and releases through the implementation of the Grissom ARB Hazardous Material Emergency Planning and Response Plan (Grissom ARB 2014a), which meets the requirement for a Facility Response Plan (FRP) and Spill Prevention Control and Countermeasures (SPCC) Plan. This plan provides Grissom ARB with a comprehensive approach to spill prevention and response. The Hazardous Material Emergency Planning and Response Plan outlines activities to be undertaken to minimize the adverse effects of a spill, including notification, containment, decontamination, and cleanup of spilled materials.

3.1.9.1.2 Toxic Substances

Toxic substances, as regulated under the Toxic Substances Control Act (TSCA), include asbestos, lead, and polychlorinated biphenyls (PCBs). For the purposes of this Draft EIS, these are evaluated in their common forms (e.g., asbestos-containing materials [ACMs] and lead-based paint [LBP] found in buildings, and as PCBs found in electrical transformers or other mechanical devices).

The Asbestos Management Plan implements AFI 32-1052 policies and establishes procedures for accomplishing asbestos-related activity (Grissom ARB 2010b). An asbestos database is maintained by the Civil Engineering (CE) squadron. All O&M, Military Construction (MILCON), and Simplified Acquisition Bases Engineering Requirement projects are reviewed to determine if ACMs are present in the proposed project location. For any project on base, waste materials

containing more than one percent ACM must be disposed of at a permitted off-base landfill by the contractor in accordance with Indiana Special Waste and Federal regulations.

With regard to LBP, Grissom ARB currently has no residential housing, target housing, or child-occupied facilities as defined by the U.S. Department of Housing and Urban Development (HUD). Therefore, all base buildings are designated as non-priority buildings and HUD standards do not apply. The LBP Management Plan provides guidance and establishes procedures for accomplishing LBP-related activities (Grissom ARB 2012). LBP records and project files are maintained by the CE squadron. Renovation, demolition, and requests for self-help projects are reviewed to determine if lead-containing materials are present in the proposed project location. For any project on base, LBP wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill. Grissom ARB is reportedly PCB-free (Walters 2015).

3.1.9.2 Hazardous Waste Management

Grissom ARB is classified as a large-quantity generator (LQG) (Grissom ARB 2013). Typical hazardous wastes generated during O&M activities include solvents, rags, paint, paint thinners and strippers, blasting media, used filters, waste oils cleaners, hydraulic fluids, lubricants, aerosols, and sealants/adhesives.

Hazardous wastes are managed in accordance with the Hazardous Waste Management Plan (Grissom ARB 2013). This plan provides the policies and procedures for the proper management of hazardous wastes generated during base operations and aircraft maintenance as required by Federal and state laws and regulations. In 2015, 10,041 pounds of hazardous wastes were removed from Grissom ARB and disposed of in off-base permitted disposal facilities. However, this volume of hazardous waste was higher than the average of the 2 prior years (4,165 pounds), because the bulk jet fuel tanks were cleaned in 2015 (Woodring 2016b).

3.1.9.3 Environmental Restoration Program

There are 14 Installation Restoration Program (IRP) sites at Grissom ARB, 8 of which have been closed. These sites are administered in accordance with the Management Action Plan. The Management Action Plan presents the comprehensive strategy for implementing response actions necessary to protect human health and the environment in accordance with applicable laws and regulations (Grissom ARB 2015a). Environmental response actions are planned and executed under the IRP in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and other applicable laws. Grissom ARB is not listed on USEPA's National Priorities List and is not required to enter into a Federal Facilities Agreement (FFA) with the USEPA.

3.1.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Grissom ARB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Cass County and Miami County, Indiana.

3.1.10.1 Baseline Conditions

3.1.10.1.1 Population

The total population in the two-county ROI has decreased since 2010. Between 2010 and 2014, the population in the two-county ROI decreased at an average annual rate of 0.2 percent, with a total decrease of approximately 745 persons over the four-year period (USCB 2010; 2014a) (see Table 3-7). Logansport, the county seat and largest city in Cass County, has an estimated population of 17,933. The City of Peru, the county seat and largest city in Miami County, has an estimated population of 11,199. Both cities have also experienced a decline in population since 2010 (USCB 2010, 2014a).

Table 3-7. Population in the ROI for Grissom ARB

Location	2010	2014	Annual Percent Change (2010–2014)
Cass County, Indiana	38,966	38,730	-0.2%
Miami County, Indiana	36,903	36,394	-0.3%
Total (ROI)	75,869	75,124	-0.2%

Source: USCB 2010, 2014a

As shown in Table 2-4, the total current personnel on base at the 434 ARW at Grissom ARB is 1,715 persons. This includes 47 military, 246 DoD civilians, 110 contractors, and 1,312 part-time Reservists. In addition, there are an estimated 972 military dependents and family members associated with the full-time military and civilian personnel associated with the 434 ARW. Only full-time personnel were considered for this analysis, thus the 1,312 part-time Reservists were not considered part of the work force for this analysis.

3.1.10.1.2 Economic Activity (Employment and Earnings)

Per the most recent 2014 county employment data available from the Bureau of Economic Analysis (BEA), employment totaled 18,731 jobs in Cass County and 10,077 jobs in Miami County (BEA 2015a). The largest employment sector in Cass County was manufacturing (23.6 percent), followed by government and government enterprises (17.7 percent), and retail trade (10.5 percent) (BEA 2015a). The largest employment sector in Miami County was government and government enterprises (27.2 percent), followed by manufacturing (18.6 percent), and retail trade (12.3 percent) (BEA 2015a). Construction accounted for 4.7 percent of total employment in Cass County and 7.4 percent of total employment in Miami County. The 2014 unemployment rate reported by the Bureau of Labor Statistics (BLS) was 5.8 percent in Cass County, 6.8 percent in Miami County, and 5.9 percent in the State of Indiana (BLS 2016a). Per capita personal income in Cass County and Miami County is estimated at \$34,249 and \$30,334, respectively (BEA 2015b).

Grissom ARB is an important contributor to the local economy through employment of military and civilian personnel, and expenditures for goods and services. The total economic impact of the base on the surrounding communities for 2015 was \$124.9 million (Heikkinen 2016). The estimated \$27.4 million that Grissom expended on equipment, supplies, contracts, and minor construction had a \$25 million impact on local community job creation (Heikkinen 2016).

3.1.10.1.3 Housing

Table 3-8 presents census-derived housing data for Cass and Miami Counties. Cass County had 16,399 total housing units in 2014, of which 9.5 percent (1,640 units) were vacant (USCB 2014b). Miami County had 15,384 total housing units in 2014, of which 15.5 percent (2,138 units) were vacant (USCB 2014b). The median value of owner occupied housing units is estimated at \$81,100 in

Cass County and \$85,100 in Miami County. The median gross monthly rent for occupied units paying rent was \$629 in Cass County and \$646 in Miami County (USCB 2014b).

Table 3-8. Housing Data in the ROI for Grissom ARB, 2014

Location	Housing Units	Occupied	Vacant
Cass County	16,399	14,759	1,640
Miami County	15,384	13,246	2,138
Total (ROI)	31,783	28,005	3,778

Source: USCB 2014b

No dormitories or on-base housing are currently located on Grissom ARB. No temporary lodging facilities (TLFs) are located on Grissom ARB, because these are not authorized on AFRC bases. The Grissom ARB lodging operation currently has 312 visiting quarter (VQ) rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a permanent change of station (PCS) move (USAF 2015b).

3.1.10.1.4 Education

There are 14 schools in four school corporations in Cass County. During the 2015 to 2016 school year, 7,241 students were enrolled in grades kindergarten through twelve (K-12) (IDOE 2016). The average student-to-teacher ratio in Cass County is estimated at 13.8:1. There are 15 schools in four school corporations in Miami County. During the 2015 to 2016 school year, 7,151 students were enrolled in grades K-12 throughout (IDOE 2016). The average student-to-teacher ratio in Miami County is estimated at 16.2:1. No schools, childcare, or youth programs are currently operated on or provided by Grissom ARB.

3.1.10.1.5 Public Services

Public services in Cass and Miami Counties include law enforcement, fire protection, emergency medical services (EMS), and medical services. Indiana State Police District 16-Peru covers seven counties, including Cass County and Miami County (Indiana State Police 2016). Several fire stations are located throughout the ROI. These include the Logansport and Peru Fire Departments, which provide public safety services for residents of Logansport and Peru, respectively. The Logansport Memorial Hospital, located in Logansport, Cass County, is an 83-bed facility with 113 registered nurses (Consumer Reports 2016). Dukes Memorial Hospital, located in Peru, Miami County, is a 25-bed critical access facility with 443 healthcare professionals (Dukes Memorial Hospital 2016). Both hospitals are located within 20 miles of Grissom ARB.

3.1.10.1.6 Base Services

The 434 Aerospace Medicine Squadron (AMDS) has the capability to fully support the Individual Medical Readiness (IMR) and Personal Health Assessments (PHA) for the USAF population on Grissom ARB. Other base services located on Grissom ARB include a fitness center and a dining facility (DFAC). The 19,000 square foot fitness center has been renovated within the past 5 years and is currently staffed by five full-time equivalent (FTE) civilian positions. The hours of operation are 5:00 A.M. to 7:00 P.M. Mondays thru Fridays, 5:00 A.M. to 8:00 P.M. on Saturday, 5:00 A.M. to 2:00 P.M. on Sunday, and closed on non-Unit Training Assembly (UTA) weekends and holidays. The DFAC is only in operation during the Primary and Alternate UTA weekends due to manning of the facility by Traditional Reservists only available during drill weekends. Two on-base food options available during the week include the Services Club-operated Boomers Café and the Exchange Shopette.

3.1.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the “affected area” or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB $L_{A_{dn}}$ or greater resulting from a proposed action that are not currently exposed to those noise levels at baseline conditions as described under the No Action Alternative (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area. As described in Section 3.1.1.1, there are no people and therefore no minority or low-income populations in the ROI. There are also no noise-sensitive receptors (e.g., schools or hospitals) located within the ROI.

THIS PAGE INTENTIONALLY LEFT BLANK

3.2 SEYMOUR JOHNSON AIR FORCE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the KC-46A MOB 3 mission at Seymour Johnson AFB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

3.2.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Updated baseline operations data was provided by installation POCs in December 2015, and was reviewed and validated by installation POCs in March 2016 after being processed for input to the computer noise model. Under baseline conditions, KC-135 aircraft based at Seymour Johnson AFB conduct 2,568 airfield operations per year, and based F-15E aircraft conduct 55,800 airfield operations per year. Transient aircraft conduct 942 airfield operations per year at Seymour Johnson AFB. An airfield operation occurs each time an aircraft departs from the runway and each time an aircraft approaches the runway. Maximum noise levels (dB L_{Amax}) generated by KC-135 and F-15E aircraft overflights are listed in Table 3-9. KC-135 aircraft are 9 dB quieter than F-15E aircraft during approach and 27 dB quieter than F-15E aircraft during departure at a distance of 1,000 feet.

Table 3-9. Aircraft Maximum Noise Levels at Seymour Johnson AFB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
F-15E	82% NC	92	85	73	63
Takeoff					
KC-135	90% NF	87	80	69	59
F-15E	91% NC	114	105	94	84

Note: 916 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models; F-15E aircraft are equipped with Pratt and Whitney F100-PW-220 engines.

Key: Power Units: NF = fan speed; NC = engine core speed.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 °F and 70 percent relative humidity.

Approximately 13 percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). These late-night operations are needed to support mission requirements. Based F-15E and transient aircraft conduct 2 percent of airfield operations during acoustic night.

Noise levels reflecting baseline flying operations are shown on Figure 3-3. In accordance with current USAF and DoD policies, the baseline noise levels (L_{Adn}) were created using NOISEMAP (Version 7.2). NOISEMAP accounts for topography effects on noise, and noise levels are calculated for a day with 1/365th of annual operations (known as an “average annual day”). The 65 dB L_{Adn} noise contours published in the 2011 AICUZ report are also shown as a point of reference (USAF 2011). The relatively minor differences between the AICUZ noise contours and the updated baseline noise levels can be attributed to the recent cessation of F-15E demonstration

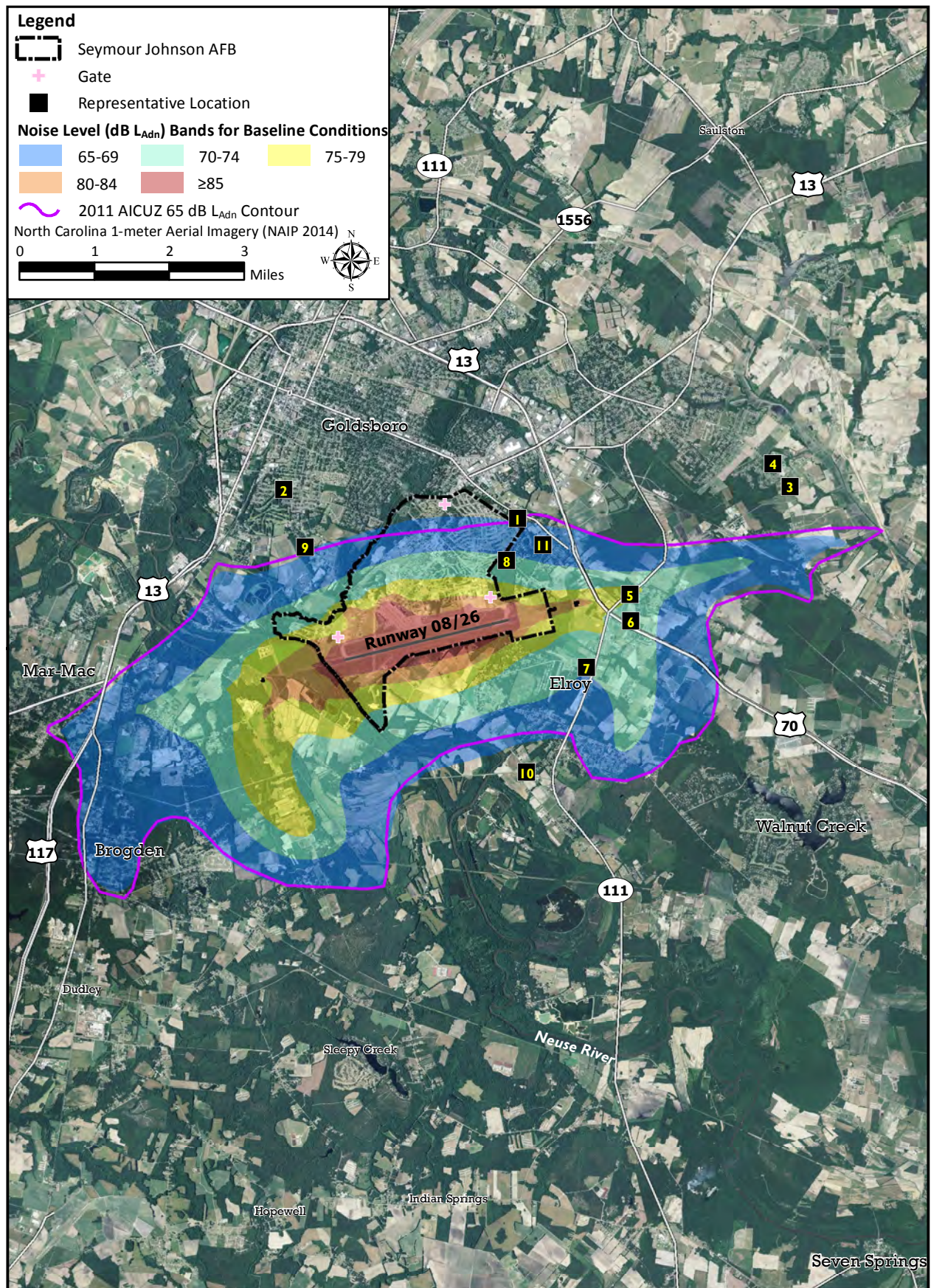


Figure 3-3. Baseline Noise Levels (dB L_{Adn}) at Seymour Johnson AFB

team flying operations, minor updates to KC-135 flight profiles, and the fact that NOISEMAP (Version 7.2) considers topographical features.

The number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} is listed in Table 3-10. At noise levels greater than 65 dB L_{Adn} , not all land uses are considered compatible per USAF and DoD guidelines. Residences are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included in the residence to provide increased outdoor-to-indoor noise level reduction. Residences are not considered compatible at noise levels greater than 75 dB L_{Adn} . Under baseline conditions, 15,669 acres of off-base land are exposed to noise levels greater than 65 dB L_{Adn} , and 2,857 acres are exposed to noise levels greater than 75 dB L_{Adn} .

**Table 3-10. Acres Exposed to L_{Adn} Resulting from Baseline Conditions
Seymour Johnson AFB**

Noise Level (dB L_{Adn})	Area (In Acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	572	8,324	8,896
70 - 74	523	4,488	5,011
75 - 79	551	2,117	2,668
80 - 84	482	600	1,082
≥ 85	843	140	983
Total	2,971	15,669	18,640

Under baseline conditions, an estimated 7,682 off-base residents are affected by noise levels greater than 65 dB L_{Adn} , and an estimated 666 people are affected by noise levels greater than 75 dB L_{Adn} (Table 3-11). Approximately 12 percent of people affected by 65 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise. The prevalence of annoyance increases as noise levels increase. For example, approximately 35 percent of people exposed to 75 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise (Schultz 1978; Finegold et al. 1994).

**Table 3-11. Estimated Off-Base Population Exposed to L_{Adn} Resulting from Baseline
Conditions at Seymour Johnson AFB**

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	4,686
70 - 74	2,330
75 - 79	536
80 - 84	69
≥ 85	61
Total	7,682

As per a DoD policy memorandum, people exposed to noise at greater than 80 dB L_{Adn} would have an increased likelihood of experiencing noise-induced permanent threshold shift (NIPTS) (USD 2009). The noise metric 24-hour exposure level (L_{eq24}), rather than L_{Adn} , is recommended for use in assessing hearing impairment risk (DNWG 2013). The L_{eq24} metric is equivalent to L_{Adn} but does not add a decibel weighting factor to late-night noise events. The decibel weighting factor

is relevant to estimating annoyance, but is not relevant to the physical mechanisms that can result in hearing impairment.

An estimated 109 off-base residents are exposed to noise levels greater than 80 dB L_{eq24} under baseline conditions (Table 3-12) and are at an increased risk of hearing loss per DoD assessment methods (see Appendix B, section B.1.3.1 for discussion of relevant assessment methods and policies). The 109 residents in the affected area were distributed into decibel intervals proportionally based on the locations of residential structures as identified through interpretation of aerial photography. Table 3-12 quantifies hearing loss risk in terms of NIPTS, a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the threshold shift that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at the age of 20 years and lasting 8 hours per day for 5 days per week. Potential NIPTS values are given for individuals of average sensitivity to noise and for individuals that are highly sensitive (10th percentile). While it is known that people inside their homes would be exposed to less noise and therefore be at less risk of NIPTS, it is not known how much time any given individual spends indoors. Studies indicate that, on average, Americans spend 13 percent of their time outdoors (Klepeis et al. 2001). Table 3-12 lists potential NIPTS as a function of L_{eq24} if the affected persons are fully exposed to the noise level at his or her residence (i.e., outdoors 100 percent of the time) and also lists NIPTS if he or she is outdoors for the national average 13 percent of the day. Changes in hearing levels of less than 5 dB are generally not considered noticeable (USEPA 1974), and there is no known evidence that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual. Furthermore, the variability in audiometric testing (testing of hearing ability) is generally assumed to be ± 5 dB.

Table 3-12. Estimated Off-Base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions at Seymour Johnson AFB

Noise Level (dB L_{eq24}) ^a	Estimated Off-Base Population Exposed to Indicated Noise Levels	100 Percent of Time Outdoors		National Average Percent Time Indoors	
		Average NIPTS (dB) ^b	10th Percentile NIPTS (dB) ^b	Average NIPTS (dB) ^b	10th Percentile NIPTS (dB) ^b
80–81	11	3	7	n/a ^c	n/a ^c
81–82	33	3.5	8	n/a ^c	n/a ^c
82–83	11	4	9	1	3.5
83–84	0	4.5	10	1	4
84–85	11	5.5	11	1.5	4.5
85–86	11	6	12	2	5.5
86–87	11	7	13.5	2.5	6.5
87–88	0	7.5	15	3	7
88–89	11	8.5	16.5	3.5	8
89–90	10	9.5	18	4	9
Total	109				

^a Relationships between L_{eq24} and NIPTS were derived from CHABA 1977.

^b NIPTS values rounded to the nearest 0.5 dB.

^c Equivalent exposure noise level is less than 75 dB L_{Adn} , below the threshold at which NIPTS has been demonstrated to occur.

At Seymour Johnson AFB, 107 industrial, administrative, and recreational buildings are currently exposed to noise levels greater than 80 dB L_{eq24} . No residential buildings on-base are exposed to noise levels greater than 80 dB L_{eq24} . Hearing loss risk among workers at Seymour Johnson AFB is

managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Seymour Johnson AFB.

Aircraft noise levels (dB $L_{A_{dn}}$) at several representative locations near Seymour Johnson AFB are listed in Table 3-13. The locations, which are shown on Figure 3-3, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the churches studied experience noise levels similar to those experienced at the churches. Six (6) of the 11 locations studied experience baseline noise levels greater than or equal to 65 dB $L_{A_{dn}}$. Noise sensitive land uses (e.g., schools and residences) are not considered to be compatible at noise levels greater than 65 dB $L_{A_{dn}}$ unless special construction measures are taken to reduce indoor noise levels.

Table 3-13. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Seymour Johnson AFB

Location ID	Location Description	Aircraft Noise Level (dB $L_{A_{dn}}$)
1	Meadow Lane Elementary	65
2	Carver Heights Elementary	59
3	Eastern Wayne Elementary	56
4	Eastern Wayne High	60
5	Miller's Chapel	76
6	New Hope Friends Church	73
7	Sheridan Forest Worship Center	70
8	Atkinson Chapel Church	70
9	Bible Faith Missionary Baptist	64
10	Harvest Baptist	63
11	Korean Presbyterian Church	68

Local flying guidance restricts aircraft operations between the hours of 10:30 P.M. and 6:00 A.M. to time-critical operations (e.g., alert operations, deployments, and periodic night training exercises). Of the 21 noise complaints made during the 5-year period between 2011 and 2015, 10 complaints were specifically regarding noise generated by F-15E aircraft. The remainder did not specify aircraft type. None of the complaints were specific to KC-135 aircraft noise.

Kinston Regional Jetport is a public airport that is used on a regular basis by aircraft from Seymour Johnson AFB and a wide variety of other military aircraft. The airfield supports 21,112 aircraft operations annually (FAA 2016). Approximately 70 percent of the operations are cargo-type jet aircraft, 20 percent are fighter aircraft, and 10 percent are propeller-driven aircraft (Barkes 2016). Kinston Regional Jetport is located in a lightly-populated area, and noise complaints are received infrequently (Barkes 2016).

3.2.2 Air Quality

Air emissions resulting from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would primarily affect air quality within Wayne County. The proposed operation of KC-46A aircraft at nearby Kinston Regional Jetport in Lenoir County also would affect air quality in the immediate vicinity of this facility and along aircraft flight routes between this location and Seymour Johnson AFB. The North Carolina Department of Environmental Quality (NC DEQ) Division of Air Quality (DAQ) uses the NAAQS and state standards

established for total suspended particulates to regulate criteria air pollutant levels. Additional background information on the CAA and NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.2.

The DAQ enforces the national and state ambient air quality standards by monitoring state-wide air quality and developing rules to regulate and permit sources of air emissions. The North Carolina Air Quality Rules are contained in the *North Carolina Administrative Code* Title 15A, Subchapters 2D, 2H, and 2Q (NC DENR 2016).

3.2.2.1 *Region of Influence and Existing Air Quality*

Wayne County currently attains all of the NAAQS (USEPA 2016a). Lenoir County, which encompasses Kinston Regional Jetport, also attains all NAAQS.

3.2.2.2 *Regional Air Emissions*

Table 3-14 summarizes annual emissions developed for Wayne County in 2011 as part of the NEI process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) fuel combustion by electrical utilities (NO_x and sulfur oxides [SO_x]), (3) solvent/surface coating usages (VOCs), and (4) fugitive dust (PM₁₀/PM_{2.5}).

Table 3-14. Annual Emissions for Wayne County, North Carolina, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Stationary Sources	2,156	3,718	3,135	9,749	5,438	1,597	NA
Mobile Sources	1,860	18,176	2,883	14	186	111	740,809
Total	4,015	21,894	6,019	9,763	5,624	1,708	740,809^a

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Wayne County are incomplete.

Key: CO₂e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

Source: USEPA 2016b

3.2.2.3 *Seymour Johnson AFB Emissions*

Emissions due to existing operations at Seymour Johnson AFB occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-15 summarizes estimates of the most recent annual operational emissions generated by the 916 ARW at Seymour Johnson AFB. These data were developed in part from the *CY2014 Air Emissions Inventory - Air Program Information Management System - Seymour Johnson Air Force Base, North Carolina* (Zapata Inc. and URS Group, Inc. 2015) and activity data collected for 2015 operations.

Because KC-135 on-wing testing emission data were not available for Seymour Johnson AFB, emission data from KC-135 maintenance activities at Fairchild AFB were used on a per-aircraft basis for activities at Seymour Johnson AFB (AFCEC 2014a). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.2, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Seymour Johnson AFB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Table 3-15. Annual Emissions from Existing Operations of the 916 ARW at Seymour Johnson AFB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC-135 Aircraft Operations	2.76	42.61	40.90	4.23	0.23	0.23	11,794
On-Wing Aircraft Engine Testing – KC-135	1.06	15.39	5.96	0.79	0.04	0.04	2,200
AGE	0.05	0.27	0.29	0.00	0.04	0.04	45
GMVs	0.08	1.48	0.70	0.00	0.06	0.03	207
POVs – On Base	0.20	6.54	0.77	0.01	0.10	0.02	515
POVs – Off Base	0.25	10.79	1.43	0.02	0.09	0.03	811
Point and Area Sources	1.97	0.05	0.12	0.01	0.08	0.07	-
Total Emissions^a	6.36	77.13	50.16	5.06	0.64	0.46	15,572

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Wayne County are incomplete.

Key: CO₂e(mt) – carbon dioxide equivalent in metric tons

Seymour Johnson AFB operates under DAQ Permit No. 03743R22 (NC DEQ 2015a). Sources that operate under this permit include paint spraying operations, jet engine testing houses, small engines for arresting gear systems, and diesel-powered emergency generators.

3.2.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.2.3.1 Flight Safety

Aircraft flight operations at Seymour Johnson AFB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. No Class A or B mishaps have occurred during the past 3 years at Seymour Johnson AFB. Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of \$2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or inpatient hospitalization of three or more personnel and/or a total cost of between \$500,000 and up to \$2 million.

The KC-135 and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF Major Commands (MAJCOMs) to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur

above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.2.3.1.1 Wildlife Strike Hazard at Seymour Johnson AFB and Vicinity

From 2011 to 2015, Seymour Johnson AFB personnel recorded 290 bird strikes in the airfield and airspace. Approximately 66 percent of the bird strikes were recorded by the 4 Fighter Wing (FW), which conducts operations on low-level routes and also operates at the Dare County Range. The concentration of birds at and around Seymour Johnson AFB poses a substantial risk to flying operations. The terrain, bodies of water, and climate are ideal living conditions for birds year-round, as well as migratory species. Many Seymour Johnson AFB low-level routes and the Dare County Range are located within the Atlantic Flyway, one of the most concentrated areas of migratory birds in the United States.

The 4 FW BASH Plan, which also provides BASH guidelines to 916 ARW aircrews, provides specific guidance and assigns responsibilities in developing an effective bird strike hazard reduction program for Seymour Johnson AFB (Seymour Johnson AFB 2015b).

The BASH Plan is implemented in two phases. Phase I extends from November through August when wildlife activity is generally low. The primary threat during Phase I is from turkey vultures, hawks, and waterfowl. During the rainy periods between December and April, gull activity increases on and around the runway environment. The City of Goldsboro operates a wastewater treatment pond facility off the west end of the runway that attracts more than 1,000 wintering waterfowl between November and April. Phase II extends from August through November, when wildlife activity is increased due to fall migration. The primary threat during Phase II is from flocking blackbirds, swallows, and mourning doves.

The BASH Plan establishes implementation procedures and actions to minimize the potential of bird-aircraft strikes. Such measures include eliminating broad-leaf weeds, maintaining grass heights between 7 and 14 inches, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding (insects are a major food source for birds during much of the year). BASH reduction techniques currently employed by the base include abating nuisance avian species, pyrotechnics, and depredation when necessary.

3.2.3.2 Ground Safety

Seymour Johnson AFB, the City of Goldsboro, and Wayne County Planning Departments work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established to delineate recommended surrounding land uses for the protection of people and property on the ground. Runway 08/26 at Seymour Johnson AFB has CZs encompassing an area 3,000-feet-wide by

3,000-feet-long. APZ I is 3,000-feet-wide by 5,000-feet-long and APZ II is 3,000-feet-wide by 7,000-feet-long. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2011 AICUZ Study. Estimates based on the 2010 census indicate that no individuals reside in the CZs, while 645 persons reside within the APZs, primarily in APZ II (611), west of the base (USAF 2011).

The Seymour Johnson Fire Emergency Services Flight provides 24-hour crash, structural, and emergency medical first response; technical rescue; hazardous material and weapons-of-mass-destruction incident response; and fire prevention, safety, and training/education services to Seymour Johnson AFB. The base is equipped with two fire stations providing emergency resources to both the 4 FW F-15E parking ramp and the 916 ARW hangars and apron. The Fire Emergency Services Flight also has local mutual-aid agreements with the City of Goldsboro Fire Department and the Wayne County Firefighter's Association.

3.2.4 Soils and Water

3.2.4.1 Soil Resources

Seymour Johnson AFB is located in the Coastal Plain region of North Carolina. The Coastal Plain region is dominated by floodplains of the Neuse River and former terraces of the river. The area surrounding the base is flat to gently rolling with elevations ranging from 48 feet to 121 feet AMSL. The greatest topographic relief on the base is along Stoney Creek which defines the northwestern boundary of the base. The base landscape includes a portion of the Neuse River floodplain, which forms the southwest boundary of the base. Twenty-three (23) different soil types in four different soil associations are present on the base. Soils on Seymour Johnson AFB are dominated by Rains sandy loam, Johns sandy loam, Wagram (0-6 percent slopes) sandy loam sand, and Norfolk (0-2 percent slopes) loamy sand (Seymour Johnson AFB 2015a). The well-drained soils are primarily located on the upland areas, and the poorly drained soils tend to be located on former river terrace and floodplain areas on and near the base.

3.2.4.2 Water Resources

3.2.4.2.1 Surface Water

Seymour Johnson AFB is near the center of the Neuse River Basin Watershed (North Carolina Watersheds 2007). The Neuse River Basin Watershed contains more than 3,000 stream miles, has a drainage area of 6,235 square miles, and covers approximately 9 percent of the State of North Carolina. The primary surface waters on and near the base include the Neuse River, an unnamed tributary to the Neuse River to the South, and Stoney Creek to the North. Other surface waters on the base include Hospital Creek, Burge Ditch, Mayfield's Ditch (tributary to Stoney Creek and Burge Ditch), Prison Ditch (tributary to Stoney Creek), Golf Course Ditch and Golf Course Lake (tributary to Burge Ditch), and Bulk Fuels Ditch (tributary to Prison Ditch).

Stoney Creek drains into the Neuse River, which eventually flows into Pamlico Sound. Several former streams on base now flow through culverts, and others have been straightened and channelized. Several small ponds are also located on the base, all of which are associated with the golf course.

Both the Neuse River and Stoney Creek are classified by the North Carolina Division of Water Resources (DWR) as Nutrient Sensitive Waters (NSW). NSW is a supplemental classification intended for waters needing additional nutrient management due to excessive growth of microscopic or macroscopic vegetation. Due to excessive amounts of nutrients such as nitrogen

entering this watershed, the DWR has developed special stormwater programs for the Neuse River basin. Although there are no restrictions on watershed development activities, the NSW classification limits nutrient inputs. No waterbodies on or adjacent to the base are designated National Wild and Scenic Rivers, High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW).

Seymour Johnson AFB is not within the North Carolina Coastal Management Zone. The Pamlico Sound is impaired by excessive nutrient loading from point sources, agriculture and urban stormwater runoff. Operations at the base have a small potential to impact the health of Pamlico Sound (Seymour Johnson AFB 2015a).

Stormwater from the base discharges through a network of piped and open-channel stormwater drainage systems that collect and transport rainfall runoff through a system of outfalls into Stoney Creek or directly into the Neuse River (Seymour Johnson AFB 2015d).

The State of North Carolina issued an NPDES Phase I, MS4 Permit (NCS000335) to Seymour Johnson AFB on 1 March 2016, effective 1 April 2016 with an expiration date of 31 March 2021. The permit requirements are rooted in the federal Water Pollution Control Act, the CWA and Phase II stormwater regulations, state statutes, and state regulations adopted by the North Carolina Environmental Management Commission.

The MS4 Permit requires the base to enforce a program to address stormwater runoff from new development and redevelopment projects, including public transportation (roads and bridges) maintained by the installation. Section E includes reference to the NCG010000 permit which establishes requirements for construction sites. Section H includes reference to the NCG150000 permit which applies to various types of industrial activities that occur at Seymour Johnson AFB including deicing activities. Section C of the NCG150000 permit describes the requirements for deicing operations.

Deicing activities are not conducted on a regular basis at Seymour Johnson AFB. Since 2011, less than 2,000 gallons of deicing fluid have been used at Seymour Johnson AFB. If deicing is necessary, the installation conducts deicing activities on impervious surfaces and away from storm drains to prevent deicing effluent from entering the stormwater system. Deicing activities for KC-135 aircraft are currently conducted on the 916 ARW parking ramp.

Stormwater discharge is authorized under the MS4 Permit, but is subject to limitations and monitoring and reporting requirements. Continued operation of oil water separators not associated with wastewater discharges is also authorized. The permit covers current and future activities (post-construction requirements for development and redevelopment projects greater than 1 acre).

Seymour Johnson AFB developed a Comprehensive Watershed Protection Plan (CWPP), which was approved on 11 October 2015 by the North Carolina DWR to meet part or all of the post-construction program requirements. Requirements and status of the CWPP are reported to DWR in the annual stormwater report.

3.2.4.2.2 Groundwater

Groundwater below Seymour Johnson AFB occurs in three aquifers. From shallow to deep, these aquifers have been identified as the surficial aquifer, the Black Creek aquifer, and the Cape Fear aquifer. The unconsolidated aquifer system of the inner Coastal Plain beneath Wayne County and the base is comprised of several imperfectly connected sand bodies (USGS 1997). The surficial unconfined aquifer is underlain by a series of interbedded sands and clays comprising the regional, confined units of the Black Creek aquifer. The productive water zones of the Black Creek aquifer are

located approximately 90 feet bgs at the base. Beneath the Black Creek aquifer, the Cape Fear Formation contains the deepest aquifer system in the area. Depth to groundwater within the surficial aquifer ranges from approximately one foot bgs near the Neuse River and its tributaries to about 15 feet bgs in the central portion of the base. The average hydraulic conductivity of the surficial aquifer in the vicinity of Seymour Johnson AFB has been reported to range from 5 to 40 feet per day (Seymour Johnson AFB 2015d). The Black Creek aquifer ranges from less than 100 feet AMSL in western Wayne County to about sea level in the eastern part of the county. The Cape Fear aquifer ranges from about 50 feet above sea level in the western part of Wayne County to about 200 feet below sea level in the eastern part of the county (Winner and Lyke 1986).

Institutional controls associated with ERP sites at Seymour Johnson AFB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.2.4.2.3 Floodplains

Approximately 703 acres of the base is located within the FEMA mapped 500-year floodplain (Seymour Johnson AFB 2015a). The major flood zones are located along Stoney Creek at the northwest boundary of the base and along the Neuse River in the southwest portion of the base (see Figure 3-4).

3.2.5 Biological Resources

3.2.5.1 Vegetation

Seymour Johnson AFB is located in the Southeastern Plains ecoregion of North Carolina. The Southeastern Plains ecoregion consists of irregular-shaped plains with broad interstream areas containing agricultural lands and pastures, woodlands, and forests (Griffith et al. 2002). The installation is divided into improved, semi-improved, and unimproved areas for vegetation management.

Improved areas of the base consist primarily of turf and landscaped grounds surrounding buildings, residences, parks, and recreation fields. Semi-improved areas consist of mixtures of native and non-native plants that are mowed periodically. See Appendix E for common species known to occur in these areas. Unimproved lands include natural communities such as Coastal Plain Bottomland Hardwoods (Brownwater Subtype), Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Levee Forest (Brownwater Subtype), Cypress–Gum Swamp (Brownwater Subtype), and Mesic Mixed Hardwood Forest (Coastal Plain Subtype). All of the natural communities associated with the unimproved areas of Seymour Johnson AFB are degraded, with the exception of a portion of the Coastal Plain Bottomland Hardwoods located in the southeast corner of the base (Brownwater Subtype), which is listed to be of fair quality in the base INRMP (Seymour Johnson AFB 2015a). Vegetation management at Seymour Johnson AFB is guided by the INRMP, the Seymour Johnson General Plan, and the BASH Plan (Seymour Johnson AFB 2008, 2015a, 2015b).

3.2.5.2 Wildlife

Information on wildlife occurring on Seymour Johnson AFB is provided in the INRMP (Seymour Johnson AFB 2015a). Wildlife found at Seymour Johnson AFB includes a diversity of mammal, bird, amphibian, reptile, and fish species. Appendix E contains a partial list of species known to occur at Seymour Johnson AFB.

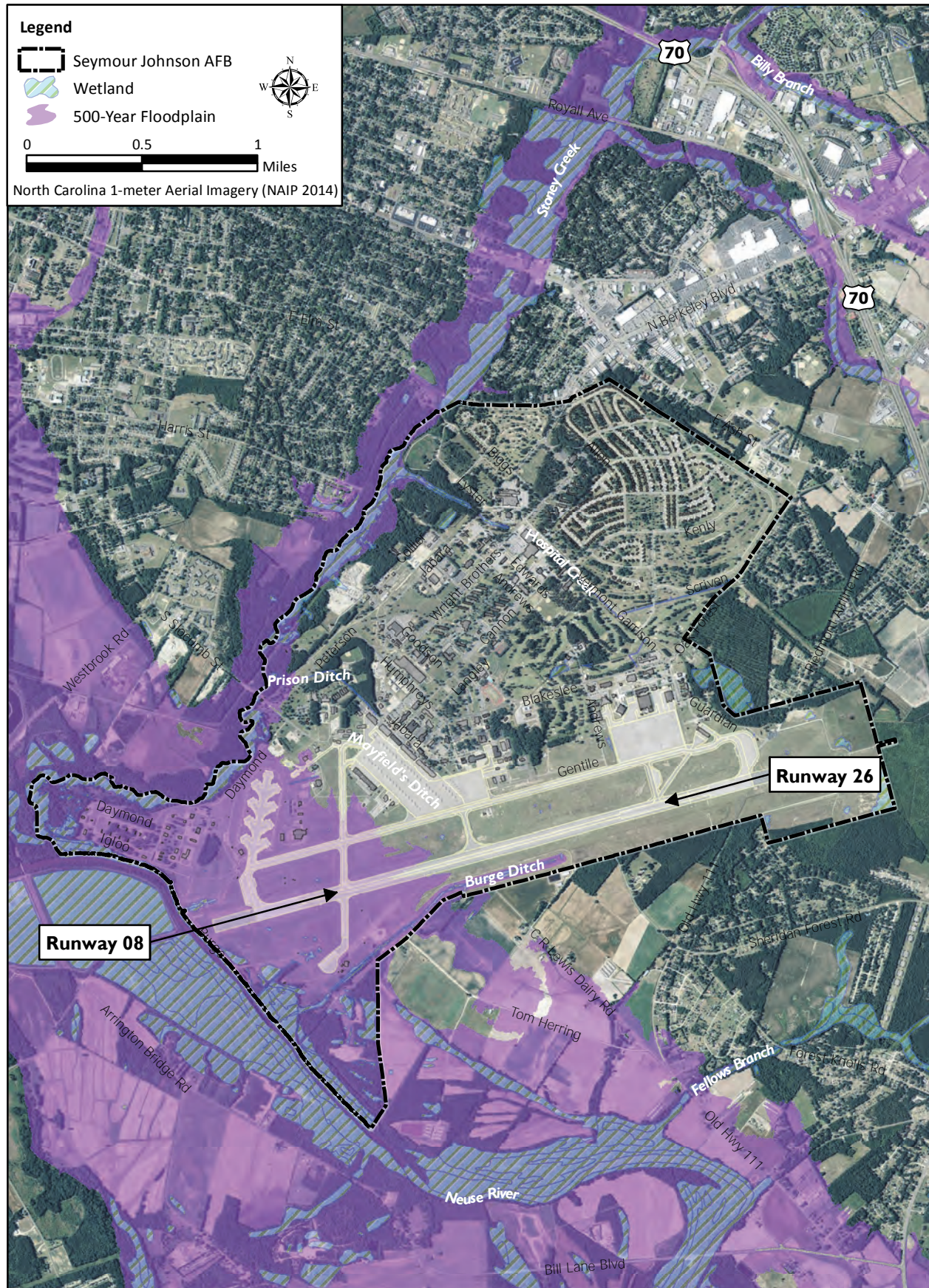


Figure 3-4. Seymour Johnson AFB Water Resources

3.2.5.3 *Special-Status Species*

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Seymour Johnson AFB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Seymour Johnson AFB. A submission for Wayne County, North Carolina, was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 31 March 2016 (Volume II, Appendix A, Section A.6.2) contains a full copy of the Trust Resource Report (USFWS 2016d). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur in Wayne County, North Carolina (USFWS 2015h). Table 3-16 presents the federally listed species identified through the IPaC and ECOS reviews.

No federally or state-listed species are known to inhabit Seymour Johnson AFB; however, avian species protected under the MBTA could occur as residents or migrants near the installation. There is no critical habitat on the base (USFWS 2015a).

Table 3-16. Federally Listed Species that Could Occur in Wayne County, North Carolina

Common Name	Scientific Name	Status		Occurrence at Seymour Johnson AFB	USFWS Online Review System
		Federal ^a	State ^b		
Clams					
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE	E	No	IPaC, ECOS

^a USFWS

^b North Carolina Wildlife Resources Commission

Key: FE – listed as endangered under the ESA, E - North Carolina Endangered

Source: Seymour Johnson AFB 2015a, USFWS 2015h, NCWRC 2014

No suitable habitat for the red-cockaded woodpecker is known to occur near the facilities and infrastructure projects described in Chapter 2. Habitat for the red-cockaded woodpecker includes mature pine forests with an open understory. Cavities are excavated in living pine trees, preferably longleaf pine (*Pinus palustris*) or other southern pines generally more than 80 years old (USFWS 2008). Mature loblolly pines (*Pinus taeda*) within the unimproved areas at Seymour Johnson AFB could provide appropriate nesting habitat. However, the availability of foraging habitat is low because forested areas are small and fragmented. A survey completed in 2002 inspected all longleaf pines present on base for signs of red-cockaded woodpecker presence. Per the USFWS, the possibility of the red-cockaded woodpecker becoming established on Seymour Johnson AFB is remote (USFWS 2002).

3.2.5.4 *Wetlands*

A review of National Wetland Inventory data for Seymour Johnson AFB identified approximately 188 acres of palustrine and riverine wetlands (Seymour Johnson AFB 2015a). The majority of these are associated with the Neuse River and Stoney Creek waterways, located along the northwestern and southwestern installation boundaries, with a few pockets occurring in the interior section of the base (Seymour Johnson AFB 2015a). Although palustrine wetlands are located in the vicinity of the airfield, none are located near the facilities and infrastructure projects described in Chapter 2 (Section 2.5.2.2.1 and Figure 2-7). Wetlands on Seymour Johnson AFB are shown on Figure 3-4.

3.2.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties.

3.2.6.1 Architectural Resources

Historical building inventories at Seymour Johnson AFB have identified two Cold War-era facilities that are potentially eligible for listing in the NRHP. Building 2130 and Building 5015 represent important Cold War-era facilities related to the Strategic Air Command (SAC) bomber mission. Seymour Johnson AFB has concluded that no other NRHP-eligible buildings are present on the installation. In compliance with Section 106 of the NHPA, the base is continuing to consult with the SHPO regarding this finding.

3.2.6.2 Archaeological Resources

In 1978, a comprehensive archaeological survey was conducted on Seymour Johnson AFB. The survey found no archaeological sites on the installation. The SHPO confirmed that no further surveys were required at the installation (see letter from the SHPO dated 9 October 1978, Volume II, Appendix A, Section A.4.2).

3.2.6.3 Traditional Resources

Seymour Johnson AFB has identified one tribe potentially affiliated with the installation. The base has reached out to that tribe in the past as part of the NEPA and Section 106 processes, and the tribe has indicated that they have no interests in projects in Wayne County (see Volume II, Appendix A, Section A.3).

3.2.7 Land Use

Seymour Johnson AFB is located in Wayne County, North Carolina, within the city limits of Goldsboro. The main base occupies approximately 3,243 acres. Land use immediately surrounding the base is a mix of residential, commercial, agricultural, and industrial (Seymour Johnson AFB 2008).

3.2.7.1 Base

Seymour Johnson AFB consists of two groupings of land: the main base and other off-base parcels, which support its mission (Seymour Johnson AFB 2008). About half of the base is dedicated to the airfield. Industrial functions, recreational areas, community support functions, open space, and housing areas occupy much of the remainder of the base on the north side of the airfield. Land use on the south side of the base is primarily open space, industrial areas (fire training area and firing range), and water.

Seymour Johnson AFB has been working closely with Goldsboro and Wayne County officials to avoid future encroachment (Seymour Johnson AFB 2008). Wayne County has addressed accident potential concerns with the adoption of a countywide zoning ordinance that restricts density within the APZs and requires high noise notifications for new housing subdivisions.

3.2.7.2 *Surrounding Areas*

Portions of the base boundary and southern city limits are coincident. Because the base is along the southern boundary of Goldsboro, the majority of the development is north of the base. Mixed residential and commercial establishments border the base to the north and east, especially in the vicinity of U.S. 70 (Business) and Berkeley Boulevard. Agricultural land and some housing developments are adjacent to the base to the east and south. To the west are the Neuse River and large former sewage treatment lagoons. Immediately to the northwest is a buffer strip of open space along Stoney Creek, and residential uses are located farther to the northwest. Northwest of that are residential uses (USAF 2011).

The USAF provides land use recommendations and guidelines for compatible use to local jurisdictions through the AICUZ program. The 1993 Seymour Johnson AFB AICUZ study was updated in 2011 (USAF 2011). The update presents and documents all changes to the AICUZ for the period of 1993 to 2011 that resulted from changes to the mix of aircraft using Seymour Johnson AFB (both transient and based), as well as changes to the operational tempo.

The noise exposure area from aircraft operations is generally focused to the east, west, and south of the runway, away from Goldsboro's population center. Based on review of the existing noise levels (see Section 3.2.1.1), it is estimated that the off-base area affected by noise levels of 65 dB $L_{A_{dn}}$ or greater is 15,669 acres. The affected land is mainly open/agriculture/low-density residential (9,793 acres) and residential (3,455 acres). The remaining acreage is a mix of commercial, industrial, public, recreational, and other uses.

The City of Goldsboro exercises extra-territorial zoning to one mile beyond its city limits. Most of the area south of the base is zoned for open space or agricultural, low-density residential, or industrial uses. An area of residential activity, including mobile homes and single-family residential dwelling south of the runway, is exposed to noise levels greater than 75 dB $L_{A_{dn}}$ (USAF 2011).

Although much of Wayne County is not zoned, the area around the base and outside of Goldsboro's extra-territorial jurisdiction is zoned. Additionally, the county adopted a noise overlay zoning district in 2005 and has a design manual for structures erected after 2005 for the purpose of incorporating noise attenuation into building construction within the district. The majority of the land exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater in Wayne County is rural, including agricultural with scattered rural residential uses (USAF 2011).

A JLUS for Seymour Johnson AFB is currently being prepared. The JLUS will address compatibility planning in the northeast North Carolina region. The primary objective is to reduce conflicts between Seymour Johnson AFB/Dare County Range and areas affected by aircraft operations while accommodating new growth and economic development, sustaining economic vitality, protecting public health and safety, and sustaining the operational missions of the base (Matrix Design Group 2016).

3.2.8 **Infrastructure**

3.2.8.1 *Potable Water System*

Potable water is provided to Seymour Johnson AFB by the City of Goldsboro. The City of Goldsboro can supply 2 MGD to the base. In addition, Seymour Johnson AFB has 2.1 million gallons (MG) of storage on base. Potable water consumption from 2011 through 2013 averaged 0.47 MGD, with a peak demand of 1.18 MGD (Seymour Johnson AFB 2014a). This amounted to 23 percent of the base water system capacity at average daily use and 59 percent of base capacity

at peak daily demand. The overall condition of the potable water system is considered adequate for current mission requirements (Hartsfield 2016).

3.2.8.2 *Wastewater*

Effluent from Seymour Johnson AFB is discharged to the City of Goldsboro wastewater treatment plant (WWTP). The WWTP capacity is 14.2 MGD, with 1.5 MGD reserved for the base. Between January 2012 and June 2013, the average effluent flow was approximately 0.395 MGD. Peak effluent flow was approximately 1.2 MGD (Seymour Johnson AFB 2014a). This average daily discharge was approximately 33 percent of the reserved flow at average daily discharge (3 percent of total capacity) and 80 percent of the reserved flow (8 percent of total capacity) at peak daily discharge. The overall condition of the sanitary sewer system is considered adequate for current mission requirements (Seymour Johnson AFB 2014a).

3.2.8.3 *Stormwater System*

Stormwater from the base is discharged via a series of drainage ditches and storm sewers through a series of outfalls and into Stoney Creek or directly into the Neuse River. The base operates under a North Carolina NPDES stormwater permit, which covers the industrial outfalls from the base to Stoney Creek and the Neuse River (Seymour Johnson AFB 2014b). The overall system is rated adequate (Abrams 2016).

3.2.8.4 *Electrical System*

Duke Progress Energy provides electrical service to Seymour Johnson AFB through a 115-kV substation located near the Wayne Manor Housing Area. The estimated supply limit is 19.3 MW. The Seymour Johnson 115-kV substation servicing the base has a maximum capacity of 31,000 kilovolt-ampere (kVA) (24.8 MW). Seymour Johnson AFB used 55.8 megawatt hours (MWh) of electricity in 2015. The electrical system on base is rated as adequate (Czuba 2016).

3.2.8.5 *Natural Gas System*

The natural gas system at Seymour Johnson AFB is supplied by Piedmont Natural Gas through natural gas lines owned by Progress Energy (main base) and the base (family housing). Seymour Johnson AFB used 124 million cubic feet (MMcf) of natural gas in 2015. The natural gas system is rated as adequate and does not represent a constraint to future development on Seymour Johnson AFB (Czuba 2016).

3.2.8.6 *Solid Waste Management*

Seymour Johnson AFB contracts with a commercial waste hauler for pick up and disposal of MSW. The base operates a recycling program that meets the minimum requirements of state laws requiring recycling of cardboard, plastic bottles, and wooden pallets. Yard waste from the housing area is separated, hauled off base, and composted. MSW from Seymour Johnson AFB is transported to the Wayne County landfill. The life expectancy of this landfill is projected to be 2031. C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal.

3.2.8.7 *Transportation*

Regional access to Seymour Johnson AFB is provided by U.S. Highway 70 (U.S. 70), and Business U.S. 70. Figure 2-8 displays the primary routes and regional transportation network in

the vicinity of Seymour Johnson AFB. U.S. 70 extends east-west and is located approximately 0.5 miles from the northern base boundary. The average daily traffic volume on U.S. 70 near the main gate in 2014 was 14,000 vehicles per day (NC DOT 2014). U.S. 70 provides access to I-95 approximately 19 miles to the northwest. I-95 connects major cities up and down the east coast.

3.2.8.7.1 Gate Access

Vehicle access to the base is provided through three gates: the Berkeley/Main Gate, Oak Forest/East Gate, and Slocumb/West Gate. The Main Gate is located at the northern end of the base on Wright Brothers Avenue near Business U.S. 70.

3.2.8.7.2 On-Base Traffic Circulation

The primary arterial roads moving traffic onto and off of the base are Wright Brothers Avenue and South Slocumb Street. All other roads on Seymour Johnson AFB feed into these two primary roads.

3.2.9 Hazardous Materials and Waste

3.2.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Seymour Johnson AFB are managed in accordance with AFI 32-7086, “Hazardous Materials Management,” and are controlled through the base HAZMART. This process provides centralized management of the procurement, handling, storage, and issuance of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials.

3.2.9.1.1 Aboveground and Underground Storage Tanks

The Seymour Johnson AFB SPCC Plan describes the measures implemented to prevent petroleum product discharges from occurring and prepares the base to respond in a safe, effective, and timely manner to mitigate the impacts of an uncontrolled discharge. Seymour Johnson AFB made a determination under 40 *CFR* 112.20(f), as recorded in the “Certification of Applicability of Substantial Harm Criteria,” that the facility does not pose a risk of substantial harm. Therefore, an FRP is not required for Seymour Johnson AFB (Seymour Johnson AFB 2014b). The SPCC Plan and Installation Emergency Management Plan (IEMP) address roles, responsibilities, and response actions for all major spills (Seymour Johnson AFB 2014c).

Seymour Johnson AFB has 11 ASTs with capacities greater than 10,000 gallons. These ASTs are located at the bulk fuel storage area (5), Type III Fuel Hydrant System (2), GOV gas station (3), and AGE Ready Line (1). These ASTs are used to store Jet-A, gasoline, and diesel. Seymour Johnson AFB also manages 9 underground storage tanks (USTs). The total Jet-A storage capacity at Seymour Johnson AFB is approximately 4,500,000 gallons (Seymour Johnson AFB 2014c). Seymour Johnson AFB used approximately 43,400,000 gallons of Jet-A in 2015, with the 916 ARW KC-135 mission using approximately 5,500,000 gallons. Seymour Johnson AFB receives fuel through a commercial pipeline and commercial tank trucks. Jet-A is delivered to the KC-135 aircraft parking ramp fuel hydrants from the Type III fuels storage ASTs via the Type III fuel hydrant system. The F-15 parking ramp fuel hydrants are supplied with Jet-A from the USTs at Pumphouse #2 (Seymour Johnson AFB 2014c).

3.2.9.1.2 Toxic Substances

The Asbestos Operating Plan establishes management responsibilities and procedures to ensure personnel and USAF facilities are not exposed to excessive levels of airborne asbestos fibers. The plan also describes how the base will carry out ACM-related work (Seymour Johnson AFB 1997). The CE squadron maintains a permanent file documenting asbestos related activities. Based on the plan, all proposed facility construction, repair, maintenance, demolition, and renovation or self-help projects must be reviewed, to the extent possible, to identify the presence of ACM prior to work beginning. Work on ACM projects would only be performed by individuals with current accreditation from the NC DEQ and training in accordance with OSHA and USEPA standards. For any project on base, ACM wastes are removed by the contractor performing the work and handled and disposed of in accordance with Federal, state, and local regulations at a waste disposal site authorized to accept such waste.

A Lead-Based Paint Management Plan is no longer required at Seymour Johnson AFB (Owen 2016). The base complies with all Federal, state, and local requirements regarding LBP and lead containing materials, activities, and hazards. None of the electrical transformers at this base have PCB containing oil (Young 2011). However, there may be PCBs in caulking and sealants in some facilities (Owen 2016).

3.2.9.2 Hazardous Waste Management

Seymour Johnson AFB is classified as an LQG. Typical hazardous wastes generated during O&M activities include flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, blast media, waste paint-related materials, and other miscellaneous wastes.

Hazardous waste generated, stored, transported, treated, or disposed of by Seymour Johnson AFB is regulated by the State of North Carolina under authority granted to the state by the USEPA. The base was issued a Hazardous Waste Management Permit by the State of North Carolina Division of Waste Management on 24 September 2015 (NC DEQ 2015b). This permit shall remain in effect for 10 years from that date.

Hazardous wastes at Seymour Johnson AFB are managed in accordance with the Hazardous Waste Management Plan (Seymour Johnson AFB 2015f). This plan covers the control and management of hazardous wastes from the point the material becomes a hazardous waste to the point of ultimate disposal, as required by Federal and state laws and regulations. In 2015, the base generated approximately 25,500 pounds of hazardous waste, which was disposed of at off-base permitted disposal facilities.

3.2.9.3 Environmental Restoration Program

There are 63 ERP sites at Seymour Johnson AFB that are administered in accordance with the Management Action Plan. The Management Action Plan describes the integrated, coordinated approach of conducting the ERP activities required at the installation (Seymour Johnson AFB 2016). Environmental response actions are planned and executed under the ERP in a manner consistent with CERCLA and other applicable laws. Seymour Johnson AFB is not listed on the USEPA's National Priorities List.

3.2.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of new facilities,

and renovations and modifications to existing facilities at Seymour Johnson AFB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Wayne County, North Carolina.

3.2.10.1 Baseline Conditions

3.2.10.1.1 Population

Population estimates for Wayne County totaled 124,093 persons in 2014 (USCB 2014a). Between 2010 and 2014, the county population increased at an average annual rate of 0.3 percent, with a total increase of approximately 1,470 persons over the four-year period (USCB 2010; 2014a). The City of Goldsboro has an estimated population of 35,908 (USCB 2014a). The population of Goldsboro has declined since 2010 (Table 3-17).

Table 3-17. Population in the ROI for Seymour Johnson AFB

Location	2010	2014	Annual Percent Change (2010–2014)
Goldsboro City	36,437	35,908	-0.4%
Wayne County	122,623	124,093	0.3%
North Carolina	9,535,483	9,750,405	0.6%

Source: USCB 2010; 2014a

As shown in Table 2-8, the total current personnel at the 916 ARW is 1,141 persons. This includes 4 military, 28 DoD civilians, 268 dual status technicians, 14 contractors, and 1,095 part-time Reservists. In addition, there are an estimated 488 military dependents and family members associated with the full-time military and civilian personnel associated with the 916 ARW. Only full-time personnel were considered for this analysis, thus the 1,095 part-time Reservists were not considered part of the work force for this analysis.

3.2.10.1.2 Economic Activity (Employment and Earnings)

In 2014 employment in Wayne County totaled 57,409 jobs (BEA 2015a). The largest employment sector in Wayne County was government and government enterprises (24.2 percent), followed by healthcare and social assistance (12.1 percent), and retail trade (11.4 percent) (BEA 2015a). Construction accounted for 3.9 percent of total employment. The 2014 unemployment rate reported by the BLS was 6.3 percent for Wayne County (BLS 2016a). The county unemployment rate was higher than the state (5.9 percent) (BLS 2016b). Per capita personal income in Wayne County is estimated at \$35,181 (BEA 2015b).

Seymour Johnson AFB is an important contributor to the Wayne County economy through employment of military and civilian personnel, and expenditures for goods and services. The total economic impact of the base on the surrounding communities in 2014 was \$594,536,645 and 9,523 local jobs created. The payroll for military, DoD civilians, and other base personnel exceeded \$411.8 million. Approximately \$2.8 million worth of MILCON and \$83.8 million of O&M expenditures also occurred on base in 2014 (Seymour Johnson AFB 2015e).

3.2.10.1.3 Housing

Table 3-18 presents census-derived housing data for Wayne County. Wayne County had an estimated 53,074 total housing units in 2014, of which 10.5 percent (5,594 units) were vacant (USCB 2014b). The median value of owner occupied housing units in Wayne County is estimated at \$108,000. The median gross rent for occupied units paying rent was \$705 (USCB 2014b).

Table 3-18. Housing Data in the ROI for Seymour Johnson AFB, 2014

Location	Housing Units	Occupied	Vacant
Wayne County	53,074	47,480	5,594

Source: USCB 2014b

There are three housing options available at Seymour Johnson AFB: privatized housing, unaccompanied housing, and housing in the local community. Military family housing at Seymour Johnson AFB is privatized and owned by Corvias Military Living. Dormitories are available on base and currently run at an 86 percent occupancy rate. Seymour Johnson AFB's lodging operation currently has 9 distinguished visiting quarter (DVQ) rooms, 83 VQ rooms, and 69 TLF rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move. Annual occupancy for lodging is approximately 78 percent (USAF 2015c).

3.2.10.1.4 Education

The Wayne County Public School (WCPS) District serves the county. WCPS District had a total enrollment of 19,588 students during the 2013 to 2014 school year (NC Report Card 2016).

No schools are currently located on Seymour Johnson AFB. Students of military families that choose to live in privatized housing are zoned to attend Meadow Lane Elementary, Greenwood Middle School, or Eastern Wayne High School (USAF 2016). Combined, these schools had 149 classroom teachers and a total enrollment of 2,252 students during the 2012 to 2013 school year. Both Meadow Lane Elementary and Eastern Wayne High School had a greater number of students than the average number of students in similarly sized schools in the district and the state. During the 2012 to 2013 school year, legislation mandated that class sizes for grades 4 through 12 would not restrict the number of students per class size (NC Report Card 2016). The 4th Force Support Squadron operates the Child Development Center (CDC). The CDC has capacity for 174 children, with a current waitlist of 10 children. The condition of the facility is adequate, but it is in need of infrastructure improvements. Family child care (home care) and youth programs are also available at Seymour Johnson AFB.

3.2.10.1.5 Public Services

The Wayne County Office of Emergency Services is comprised of five primary functions of responsibility. These include the fire marshal, emergency management, EMS, enhanced 911 communications, and security (Wayne County 2016). These functions work together to provide public services to Wayne County. Law enforcement services are provided by the Wayne County Sheriff's Department and the Goldsboro Police Department, which services more than 39,000 citizens who live and work in Goldsboro (Goldsboro 2016). The Goldsboro Fire Department is comprised of five separate stations that service Wayne County and the City of Goldsboro. The Wayne Memorial Hospital located in Goldsboro serves the communities of Wayne County and is located approximately 6 miles from Seymour Johnson AFB.

3.2.10.1.6 Base Services

The 4th Medical Group provides primary and specialty outpatient medical care and dental services for approximately 10,500 beneficiaries, including active-duty members, retirees, and their families in the Goldsboro, North Carolina, area.

Other base services include a DFAC, flight kitchen, recreational programs, fitness center, and youth and family services. There is one full-service DFAC which operates three meals per day. A flight kitchen also offers lunch, dinner, a midnight meal, and can provide ground support meals as needed. Recreation facilities include golf, bowling, parks, campgrounds, and other indoor/outdoor recreation activities. Youth and family services on base include youth programs for children ages 9 to 18 (USAF 2015c).

3.2.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the “affected area” or ROI. Populations exposed to average noise levels of 65 dB $L_{A_{dn}}$ or greater are considered adversely affected. The affected area (or ROI) represents off-base residential areas which experience annual average noise levels of 65 dB $L_{A_{dn}}$ or greater. The baseline affected area was mapped using the noise levels described in Section 3.1. Section 3.1 provides a description of the method applied to calculate the proportion of the population in the affected area.

Table 3-19 provides baseline demographic conditions in Wayne County, where Seymour Johnson AFB is located. As shown in Table 3-19, Wayne County has a higher proportion of minority and low-income populations than the State of North Carolina and the nation (Figure 3-5).

Table 3-19. Minority and Low-Income Populations Near Seymour Johnson AFB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of North Carolina	9,750,405	3,455,877	35.4%	1,716,071	17.6%
Wayne County	124,093	55,985	45.1%	27,920	22.5%

Source: USCB 2014a; 2014c

Under baseline conditions, off-base residential areas within the 65 dB $L_{A_{dn}}$ or greater noise levels extend into 17 census block groups. There is an estimated population of 7,682 people within this area. Of those, 56.9 percent (4,371 people) are minority and 36.0 percent (2,768 people) are low-income persons. Table 3-20 presents low-income populations which currently experience annual average noise levels of 65 dB $L_{A_{dn}}$ or greater. Table 3-21 presents minority populations which currently experience annual average noise levels of 65 dB $L_{A_{dn}}$ or greater. Table 3-22 presents the youth and elderly population data comparable to that provided for the low-income and minority populations. Noise-sensitive receptors located within the 65 dB $L_{A_{dn}}$ or greater noise level under baseline conditions are shown on Figure 3-5. The boundaries of Meadow Lane Elementary are located within the 65 dB $L_{A_{dn}}$ threshold under baseline conditions. During the 2012 to 2013 school year, Meadow Lane Elementary had 695 students enrolled and 44 classroom teachers for a student to teacher ratio of 16:1 (NC Report Card 2016).

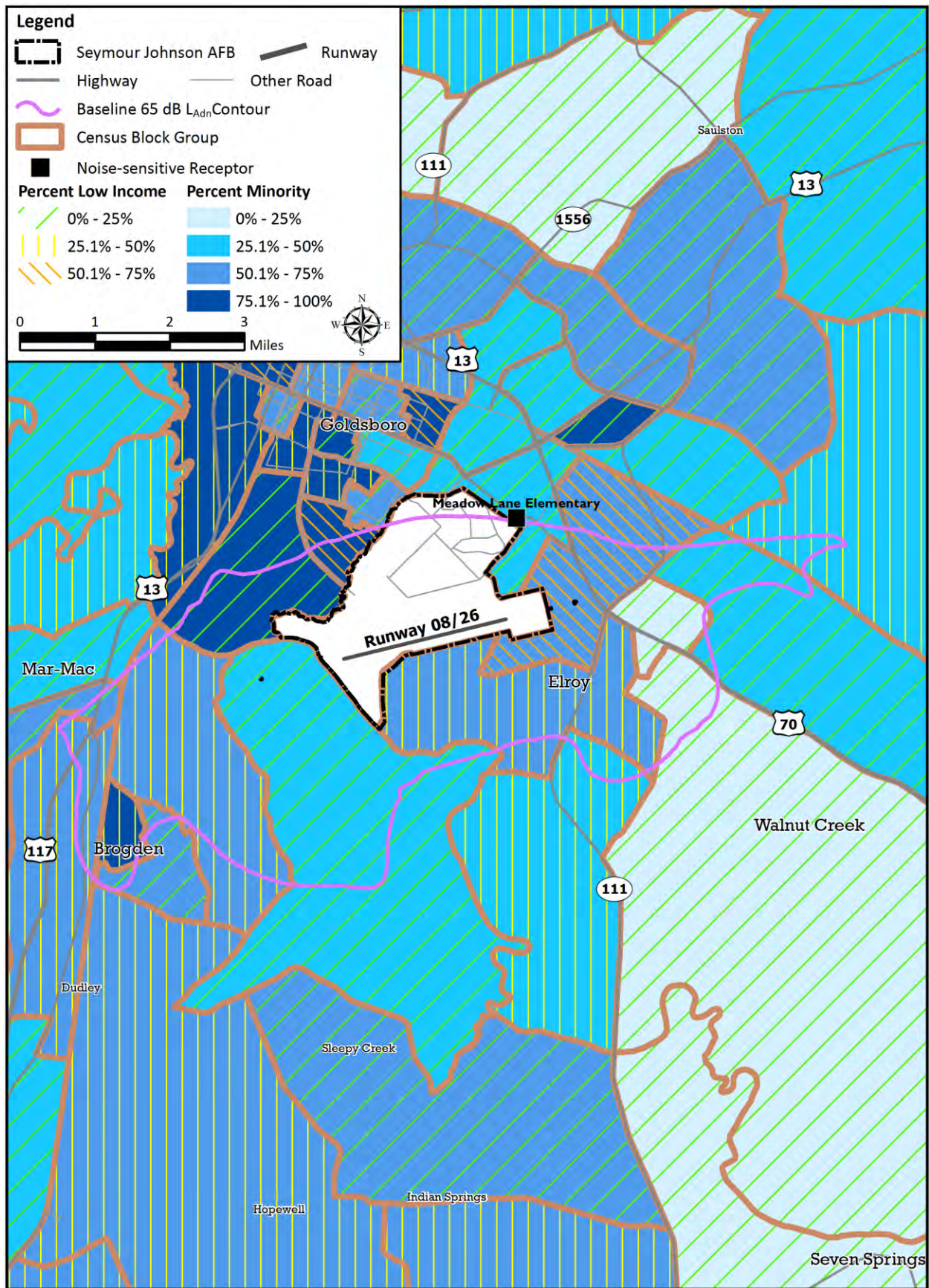


Figure 3-5. Minority and Low-Income Populations Near Seymour Johnson AFB

Table 3-20. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
371910003022	10	28.6%
371910004011	6	11.3%
371910004012	32	21.3%
371910004013	77	19.2%
371910004021	613	58.1%
371910004022	746	42.4%
371910004023	59	30.7%
371910006011	627	36.3%
371910006012	134	25.5%
371910006013	47	17.0%
371910006022	3	1.6%
371910009022	115	29.1%
371910009023	10	25.6%
371910013021	73	20.9%
371910014003	0	0.0%
371910014005	152	59.8%
371910015002	64	23.0%
Total	2,768	36.03%

Table 3-21. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Minority	
	Number	Percent
371910003022	13	37.1%
371910004011	16	30.2%
371910004012	32	21.3%
371910004013	46	11.5%
371910004021	581	55.1%
371910004022	908	51.6%
371910004023	96	50.0%
371910006011	1,112	64.3%
371910006012	413	78.5%
371910006013	201	72.6%
371910006022	82	43.9%
371910009022	233	59.0%
371910009023	25	64.1%
371910013021	138	39.4%
371910014003	1	100.0%
371910014005	239	94.1%
371910015002	235	84.5%
Total	4,371	56.9%

Table 3-22. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Seymour Johnson AFB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
371910003022	9	5
371910004011	9	8
371910004012	44	19
371910004013	23	108
371910004021	287	99
371910004022	370	217
371910004023	44	27
371910006011	422	138
371910006012	75	99
371910006013	86	31
371910006022	29	34
371910009022	80	46
371910009023	8	7
371910013021	58	82
371910014003	0	0
371910014005	71	29
371910015002	81	63
Total	1,696	1,012

Key: Youth = under 18; Elderly = 65 and over.

3.3 TINKER AIR FORCE BASE

This section describes the baseline conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Tinker AFB and, when applicable, in areas surrounding the base. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB.

3.3.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

Updated data on baseline operations were provided by pilots, ATC personnel, and other installation POCs in December 2015. After being processed for input to the computer noise model, the information was reviewed to confirm accuracy. KC-135 aircraft based at Tinker AFB conduct 2,399 airfield operations per year under baseline conditions. Other based aircraft conduct 18,708 operations per year. Aircraft involved in depot maintenance conduct 4,468 operations per year, and transient aircraft conduct 4,988 operations per year. Airfield operations are counted each time an aircraft departs from the runway and each time an aircraft approaches the runway.

Maximum noise levels (dB L_{Amax}) generated by based KC-135, E-3, and E-8 aircraft overflights are listed in Table 3-23. Table 3-23 also includes noise levels of aircraft that visit the base for depot maintenance (i.e., B-1, B-52H, E-3, E-8, KC-135). KC-135 aircraft are quieter than all of the other aircraft types listed. In 2014, the USAF published an environmental analysis document describing the effects of constructing and operating a KC-46A depot maintenance facility at Tinker AFB (USAF 2014c). KC-46A aircraft are expected to begin operations as part of the depot maintenance mission in 2018. KC-46A aircraft are about 9 dB quieter than KC-135 aircraft during approach at a distance of 1,000 feet and generate about the same noise level during departure.

Table 3-23. Aircraft Maximum Noise Levels at Tinker AFB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-135	65% NF	83	76	64	54
E-3	1.5 EPR	99	89	74	64
E-8	1.25 EPR	94	84	67	55
B-1	90% RPM	92	84	73	62
B-52H	2625 LBS/HR	96	86	70	57
KC-46A	55% N1	74	66	55	44
KC-135	90% NF	87	80	69	59
E-3	1.87 EPR	101	93	81	71
E-8	1.85 EPR	98	89	76	66
B-1	97.5% RPM A/B	118	110	98	89

Table 3-23. Aircraft Maximum Noise Levels at Tinker AFB (Continued)

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
B-52H	1.55 EPR	104	95	81	70
KC-46A	92% N1	87	78	65	55

Note: 507 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.

Key: Power Units: A/B = afterburner; N1 = engine speed at location 1; NF = fan speed; EPR = engine pressure ratio; LBS/HR = pounds of fuel burned per hour; RPM = revolutions per minute.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 °F and 70 percent relative humidity.

Eleven (11) percent of total KC-135 airfield operations are conducted between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night). The E-3 and E-8 aircraft conduct approximately 10 percent of operations during acoustic night. Aircraft at the base for depot maintenance and transient aircraft rarely conduct flights during acoustic night.

In accordance with current USAF and DoD policies, baseline L_{Adn} were created using NOISEMAP (Version 7.2). NOISEMAP accounts for topography effects on noise, and are calculated for an average annual day. The baseline L_{Adn} shown on Figure 3-6 reflects flying operations and static engine runs associated with the KC-46A depot maintenance mission, which would begin operations in 2018. KC-46A aircraft would conduct about 3,600 airfield operations per year, about 60 percent of the 6,103 total operations conducted as part of the depot mission.

Figure 3-6 also includes the 65 dB L_{Adn} noise contours as published in the 2006 AICUZ update as a point of reference (USAF 2006). Operational changes since publication of the 2006 AICUZ report, including a reduction in based aircraft operations tempo and the addition of the KC-46A depot maintenance mission, are part of the reason for the change in noise levels extent between the AICUZ report and the updated baseline. Changes in standard USAF noise calculation methodology that have occurred since 2006 also affect contour extent. The 2006 AICUZ contour was calculated to represent an average busy day, whereas current USAF policy is to model average annual day. Average annual day evenly distributes all flying operations across all days of the year. The average busy day method represents a day in which flying operations are more concentrated, and yields slightly higher noise levels than average annual day. Also, in keeping with standard noise methodology as of 2006, the AICUZ noise contours were not calculated to take into account the effects of varied topography on the spreading of noise. The updated baseline L_{Adn} reflects current USAF policy, which requires inclusion of topographic effects in calculation of L_{Adn} .

The numbers of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} are listed in Table 3-24. Residences and other noise-sensitive land uses are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included in the residence to provide increased outdoor-to-indoor noise level reduction. Several noise-sensitive land uses are considered compatible at noise levels greater than 75 dB L_{Adn} .

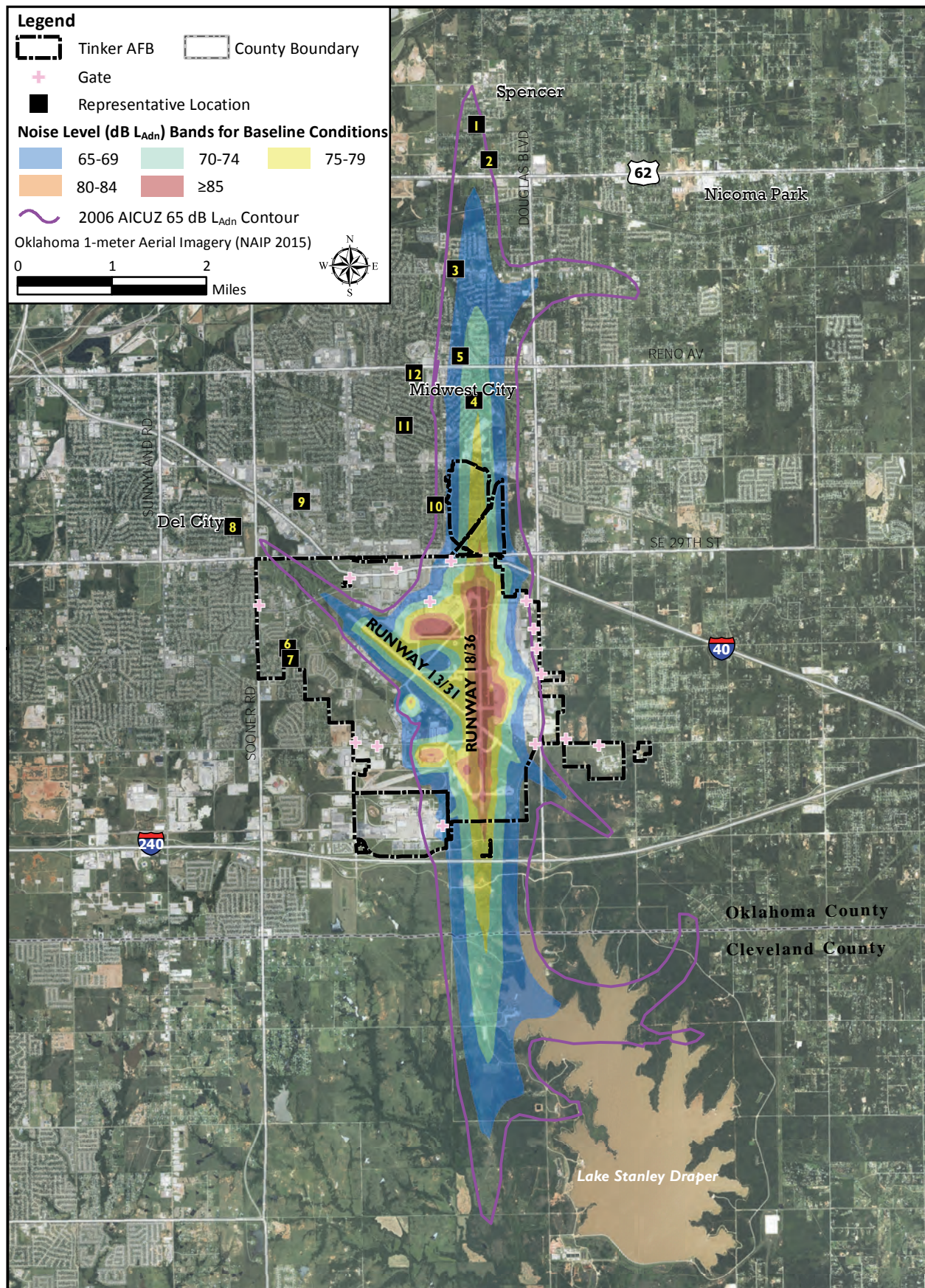


Figure 3-6. Baseline Noise Levels (dB L_{Adn}) at Tinker AFB

Table 3-24. Acres Exposed to Noise Resulting from Baseline Conditions at Tinker AFB

Noise Level (dB L _{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	762	1,674	2,436
70 - 74	646	743	1,389
75 - 79	613	163	776
80 - 84	339	6	345
≥ 85	264	0	264
Total	2,624	2,586	5,210

An estimated 5,264 off-base residents are affected by noise levels greater than 65 dB L_{Adn} under baseline conditions (Table 3-25). Approximately 12 percent of people affected by 65 dB L_{Adn} can be expected to be highly annoyed by the noise. The prevalence of annoyance increases as noise levels increase. For example, approximately 35 percent of people exposed to 75 dB L_{Adn} noise levels can be expected to be highly annoyed by the noise (Schultz 1978; Finegold et al. 1994).

Table 3-25. Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Tinker AFB

Noise Level (dB L _{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	3,859
70 - 74	1,390
75 - 79	15
80 - 84	0
≥ 85	0
Total	5,264

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base residents under baseline conditions. Five industrial buildings located along the Tinker AFB flightline are currently exposed to noise levels greater than 80 dB L_{Adn}. Hearing loss risk among workers at Tinker AFB is managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Tinker AFB.

Aircraft noise levels (dB L_{Adn}) at several representative locations near Tinker AFB are listed in Table 3-26. The locations, which are shown on Figure 3-6, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the schools studied experience noise levels similar to those experienced at the schools. Three of the 12 locations studied experience baseline noise levels greater than 65 dB L_{Adn}. Noise sensitive land uses (e.g., schools and residences) are not considered compatible at noise levels between 65 and 75 dB L_{Adn} unless special construction measures are taken to reduce indoor noise levels.

Table 3-26. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Tinker AFB

Location ID	Location Description	Aircraft Noise Level (dB L _{Adn})
1	Star Spencer High School	62
2	Spencer Road Christian School	62
3	Willow Brook Elementary School	66
4	Steed Elementary School	74
5	Midwest City Library	70
6	Child Development Center (CDC) West	42
7	Tinker Elementary School	44
8	Kerr Middle School	53
9	Rose State College	59
10	Eastside Elementary School	59
11	Country Estates Elementary School	58
12	Monterey Middle School	59

Local flying guidance restricts operations during the hours of 11:00 P.M. to 6:00 A.M. to scheduled departures, scheduled full-stop landings (i.e., no second approaches), taxi operations, and idle power static engine runs for most aircraft types. Based KC-135 and E-6 aircraft, which are equipped with relatively quiet high-bypass turbofan engines, are authorized to conduct practice approaches as late as 2:00 A.M. However, only up to two total aircraft per night are permitted to conduct patterns after 11:00 P.M.

Several additional restrictions have been imposed in order to minimize noise impacts. Aircrews are not permitted to make low-altitude practice circling approaches to Runway 18. These approaches require the aircraft to maneuver at low altitude over a heavily populated area. Aircrews avoid direct overflight of Soldier Creek School while school is in session. Aircrews approaching Runways 13 or 18 are not permitted to descend below 2,000 feet AMSL until within 2 miles of the runway. Afterburner use is restricted to emergencies, initial departures, and times when the use is required in accordance with aircraft technical orders. Finally, aircrews conducting practice approaches on Runway 36 are instructed to climb to 2,500 feet AMSL prior to initiating turns from runway headings.

From 2010 to 2015, Tinker AFB has received an average of three noise complaints per year. Of these complaints, about one-third are related to noise sources other than Tinker AFB aircraft operations.

3.3.2 Air Quality

Air emissions produced from construction and operation of the proposed MOB 3 mission at Tinker AFB would primarily affect air quality within Oklahoma County. In Oklahoma, the Air Quality Division (AQD) of the Oklahoma Department of Environmental Quality (ODEQ) is responsible for enforcing air pollution regulations. The AQD uses the NAAQS to regulate air quality within Oklahoma. Additional background information on the CAA and NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.3.

The AQD enforces the NAAQS by monitoring air quality state-wide and developing rules to regulate and permit sources of air emissions. The Oklahoma Air Pollution Control Rules are found in the *Oklahoma Administrative Code* Title 252, Chapter 100 (Air Pollution Control).

3.3.2.1 Region of Influence and Existing Air Quality

Currently, Oklahoma County is in attainment for all of the NAAQS (USEPA 2016a).

3.3.2.1.1 Regional Air Emissions

Table 3-27 summarizes estimates of the annual emissions generated by Oklahoma County in 2011 (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages and petroleum industries (VOCs), (3) fuel oil combustion (SO_x), and (4) fugitive dust from unpaved roads and construction activities (PM₁₀/PM_{2.5}).

Table 3-27. Annual Emissions for Oklahoma County, Oklahoma, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Stationary Sources	15,335	12,666	6,444	689	29,482	4,884	NA
Mobile Sources	13,457	141,719	21,881	155	1,695	915	6,588,286
Total	28,792	154,385	28,325	844	31,177	5,799	6,588,286^a

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Oklahoma County are incomplete.

Key: CO₂e(mt) – carbon dioxide equivalent in metric tons; NA – not available.

Source: USEPA 2016b

3.3.2.1.2 Tinker AFB Emissions

Operational emissions resulting from existing operations at Tinker AFB occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-28 summarizes estimates of the most recent (2015) annual operational emissions generated by the KC-135 at Tinker AFB. These data were developed in part from the *Final - Tinker Air Force Base 2009 Mobile Source Emission Inventory* (CH2MHill 2010), 2013 stationary source emissions for Tinker AFB (ODEQ 2014a), and activity data collected for 2015 operations.

Table 3-28. Annual Emissions from Existing Operations of the 507 ARW at Tinker AFB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC-135 Aircraft Operations	1.60	26.30	47.90	4.38	0.24	0.24	12,213
On-Wing Aircraft Engine Testing - KC-135	0.53	7.69	2.98	0.39	0.02	0.02	1,100
AGE	0.02	0.14	0.15	0.00	0.02	0.02	24
Nonroad Equipment	0.06	1.39	0.28	0.00	0.02	0.01	97
POVs – On Base	0.01	0.34	0.04	0.00	0.01	0.00	28
POVs – Off Base	0.75	34.58	4.63	0.06	0.30	0.09	2,633
Point and Area Sources	23.69	11.10	14.55	1.02	1.22	0.89	NA
Total Emissions^a	26.67	81.55	70.53	5.86	1.82	1.27	16,096

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Oklahoma County are incomplete.

Key: CO₂e(mt) – carbon dioxide equivalent in metric tons; NA - Not available.

Because KC-135 on-wing testing emission data were not available for Tinker AFB, emission data from KC-135 maintenance activities at Fairchild AFB were used on a per-aircraft basis for activities at Tinker AFB (AFCEC 2014a). Emission data from the usage of AGE by the 507 ARW were also not available and are thus based on a per-aircraft usage of AGE by KC-135 aircraft at Seymour Johnson AFB (Zapata Inc. and URS Group, Inc. 2015). Emission factors used to calculate combustive emissions for the KC-135 aircraft were based on emissions data developed by CFM International for the CFM56-2B1 engine (ICAO 2013a). Volume II, Appendix D, Section D.3, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Tinker AFB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Tinker AFB is an existing major source with permitted stationary source emissions of VOCs, CO, and NO_x that exceed 250 tons per year. The base operates under Title V Permit No. 2009-394-TVR (ODEQ 2014b). Emissions from the maintenance of aircraft, specifically the use of solvents; paint stripping; surface coating; jet engine testing (in test cells); inspection and repair of fuel cells and tanks; fuel combustion in boilers, heaters and emergency generators; and evaporation of VOCs from fuel storage and handling, are included in the Title V permitting. Tinker AFB is also subject to the annual reporting requirements of CO₂e from stationary source fuel combustion, as required by the USEPA Mandatory Reporting of Greenhouse Gases Rule.

3.3.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.3.3.1 Flight Safety

Aircraft flight operations at Tinker AFB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. While having aircraft in close proximity during air refueling is inherently dangerous, refueling mishaps are rare. There has been one recorded KC-135-related mishap in the vicinity of Tinker AFB during the past 10 years.

The KC-135 aircraft and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF MAJCOMs to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF

aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.3.3.1.1 Wildlife Strike Hazard at Tinker AFB and Vicinity

Between 2007 and 2012, Tinker AFB personnel recorded 141 bird strikes in the airfield and airspace (USAF 2014c). The 72 ABW BASH Plan, which also provides guidance to 507 ARW aircrews, provides specific guidance and assigns responsibilities in developing an effective bird strike hazard reduction program for the Tinker AFB local flying area (Tinker AFB 2014a).

The primary species controlled under Tinker AFB's BASH program are Canada geese, egrets, gulls, rock doves, European starlings, herons, waterfowl, and non-avian species such as beavers, and coyotes. Control of wildlife species on Tinker AFB for the purposes of BASH is generally limited to habitat management and harassment techniques, though sometimes the use of lethal control measures is required. Tinker AFB maintains a depredation permit for the take of these problematic species (USAF 2014c).

3.3.3.2 Ground Safety

Tinker AFB, Oklahoma City, Midwest City, and Del City; Oklahoma County; and planning departments work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established at military airfields to delineate recommended surrounding land uses for the protection of people and property on the ground. Runways 18/36 and 13/31 at Tinker AFB have CZs encompassing an area 3,000-feet-wide by 3,000-feet-long. APZ I is 3,000-feet-wide by 5,000-feet-long and APZ II is 3,000-feet-wide by 7,000-feet-long. The boundaries of the CZs and APZs have been used by local governments in planning documents for the purposes of identifying incompatible development. Midwest City and Del City have incorporated supplemental regulations that specifically address development within APZ I into their conventional zoning ordinances. Oklahoma City's zoning ordinances address height restriction zones around airports and airport environ zones created by existing and potential noise impact (USAF 2006).

Tinker AFB Fire and Emergency Services provides fire and crash response at Tinker AFB. Tinker AFB Fire and Emergency Services is also part of a state-wide mutual-aid agreement which coordinates with local fire departments throughout the state, ensuring availability of additional support if required.

3.3.4 Soils and Water

3.3.4.1 Soil Resources

Tinker AFB is located in the Central Redbed Plains section of the Central Lowland Physiographic Province, which is characterized by broad level flat plains and bottomlands crossed by small- to medium-sized watercourses and gently rolling hills. Elevations at Tinker AFB range from approximately 1,200 feet AMSL (Crutch Creek - northwestern portion of Tinker AFB) to 1,310 feet AMSL (southeast portion of Tinker AFB). The elevation of the airfield is approximately 1,291 feet AMSL.

Thirty-four (34) different soil types in five different soil associations are present on the base. Soils on Tinker AFB are deep, well-drained clay and loamy soils that are all conducive of construction. In the area of the 507 ARW ramp, soils are mainly comprised of the Renthin-Urban Land Complex and Urban Land Complex. Renthin Complex soils are very deep and deep well-drained clayey soils in areas of urban land. Urban Land Complex soils are also well-drained and usually comprised of fill material.

3.3.4.2 Water Resources

3.3.4.2.1 Surface Water

Primary surface water features at Tinker AFB fall into three primary discharge basins: (1) Crutcho Creek Drainage Basin, (2) Elm Creek Drainage Basin, and (3) Hog Creek Drainage Basin. The majority of the installation drains north into the Crutcho Creek Drainage Basin, which flows north into the North Canadian River. Eventually the North Canadian River combines with the Arkansas and Mississippi Rivers. Crutcho Creek extends through a culvert under the 507 ARW parking ramp. Elm and Hog Creek Drainage Basins flow south of Tinker AFB into the Little River, which forms confluences with the South Canadian, Arkansas, and Mississippi Rivers. The Elm Creek Drainage Basin is a sensitive watershed, because it supplies Lake Stanley Draper, a drinking water supply reservoir. Lake Stanley Draper is located approximately one-half mile south of the base boundary. Sixteen (16) small retention ponds and 6 detention basins have been constructed on Tinker AFB. Surface water features are shown on Figure 3-7.

The latest Oklahoma Water Quality Standards (OWQS), as established by the Oklahoma Water Resources Board (OWRB 2015), have designated beneficial uses for streams on and near Tinker AFB. Designated beneficial uses for listed surface water bodies are prescribed in Title 785 of the Oklahoma Administrative Code (OAC) Chapter 45, Appendix A.5, which was recently revised in 2015. Water bodies present on and near Tinker AFB are located in Water Quality Management Basin 5 and are listed in Appendix A.5 of Title 785 of the OAC.

Some sections of the North Canadian River and Crutcho Creek, along with Lake Stanley Draper, are considered impaired waters according to the State of Oklahoma's 2014 Integrated Report (ODEQ 2016). Where Crutcho Creek enters the North Canadian River, the river is classified into Categories 4a and 5a. Category 4a indicates that a Toxic Maximum Daily Load (TMDL) study has been completed, and Category 5a indicates that the TMDL study is underway or will be scheduled. Although a TMDL study for bacteria was completed on this reach in 2010, TMDL studies for turbidity and *Escherichia coli* (E-coli) are underway or will be scheduled (ODEQ 2016). Crutcho Creek is also classified as Category 5a for bacteria, E-coli, and dissolved oxygen. Lake Stanley Draper is classified as Category 5a for turbidity and mercury. Kuhlman Creek and Soldier Creek are classified as Category 3 and are not considered impaired. Waterbodies classified under this category have insufficient to no data and information to determine if any designated use is attained.

Tinker AFB is considered to be a federal aviation facility and is therefore required by the ODEQ to possess stormwater discharge permits. Tinker AFB has 11 permitted discharge points that fall into one of the following two permit categories: (1) NPDES permit for source pollution, or (2) construction site permit for all construction sites.

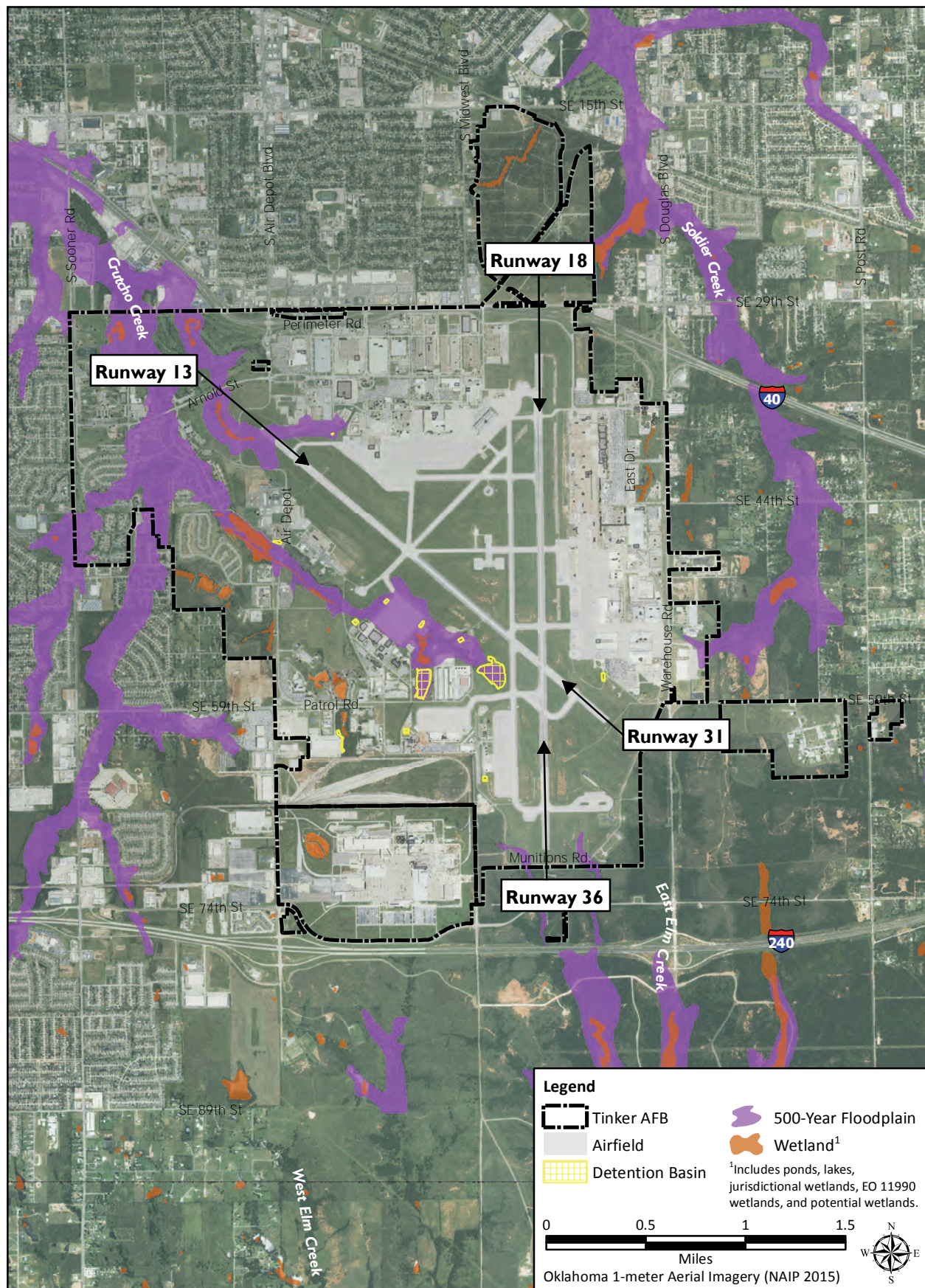


Figure 3-7. Tinker AFB Water Resources

Because a variety of different aircraft are operated by different tenants on Tinker AFB, deicing occurs at different locations across the installation. Each tenant that conducts deicing operations is required to maintain a deicing fluid recovery plan per Tinker AFB Plan 32-1002. For the purposes of this EIS, only the deicing operations that occur on the 507 ARW parking ramp are included in this analysis. The 507 ARW has not conducted deicing operations since 2009 (Jones 2016). If deicing is necessary, it is conducted on the 507 ARW parking ramp. Runoff drain covers are used to prevent deicing fluid from entering the drains, and a recovery vehicle is used after deicing is complete to recover spent deicing fluid. The spent deicing fluid is then transported to a large recovery tank on Tinker AFB for recycling or proper disposal.

Stormwater discharged at Tinker AFB is regulated by the following stormwater permits from ODEQ:

- General Permit (OKR10) for Stormwater Discharges from Construction Activities within the State of Oklahoma (September 2012).
- General Permit (OKR04) for Phase II Small Municipal Separate Storm Sewer System Discharges within the State of Oklahoma (November 2015).
- General Permit (OKR05) for Stormwater Discharges from Industrial Facilities under the Multi-Sector Industrial General Permit within the State of Oklahoma (September 2011).
- Oklahoma Pollutant Discharge Elimination System (OPDES) Permit No. OK0000809 (August 2012).

On a weekly basis, Tinker AFB collects and analyzes water samples from all creeks on the installation. These samples are acquired to monitor compliance with OWQS assigned to each creek under the NPDES and stormwater permits. In addition to analytical monitoring, other conditions are noted at each creek outfall during the field visit. These parameters include: clarity, odors, algae growth, presence of foam, and presence of oil sheen. All of these results and visual indicators are used to locate and eliminate illicit or harmful discharges. Surface water degradation is primarily due to accidental spills and non-point source pollution. The most common examples include: sediment from soil erosion associated with construction/demolition activities, oil/fluid runoff from parking lots, runoff from areas treated with fertilizers and pesticides, chemical substances and fuel from spills associated with industrial and aircraft activities, and deicing compounds from roadways, taxiways, runways, ramp areas, and aircraft.

3.3.4.2.2 Groundwater

Groundwater below Tinker AFB occurs in the Central Oklahoma Aquifer, also referred to as the Garber-Wellington Aquifer. The Garber-Wellington Aquifer underlies all or portions of eight counties, including Oklahoma County. With the exception of Oklahoma City, the major communities in central Oklahoma rely entirely or partially on groundwater from this aquifer. In addition, more than 20,000 homeowners use groundwater from this aquifer for household or domestic uses (USGS 2016).

The Garber-Wellington Aquifer has a maximum thickness of approximately 1,000 feet. Four groundwater-bearing units are located in the area: the Hennessey water bearing zone, upper saturated zone (USZ), lower saturated zone (LSZ), and the producing zone (PZ). The USZ, LSZ, and PZ are associated with the Garber-Wellington Aquifer. The Hennessey Group is the shallowest bedrock formation underlying Tinker AFB. Depth to shallow groundwater at Tinker AFB has been reported to range from a few feet to about 70 feet (USACE 2012). Groundwater in the upper 200 feet of this aquifer is typically unconfined, while groundwater at greater depths is partly confined or confined (USGS 2013). The PZ is the zone utilized for

drinking water by Tinker AFB. The Tinker AFB water supply distribution system is comprised of 26 water wells ranging from a depth of 700 to 900 feet (USAF 2007). Based on a review of Tinker AFB cross-section maps, the groundwater PZ of the Garber-Wellington begins at a depth of approximately 200 feet bgs.

Institutional controls associated with ERP sites at Tinker AFB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.3.4.2.3 Floodplains

Although two drainages to Lake Stanley Draper have small associated floodplains on Tinker AFB, floodplains on the base are primarily related to Crutcho Creek (Figure 3-8) floodplains. Three tributaries to Crutcho Creek (West Crutcho Creek, East Crutcho Creek, and Kuhlman Creek) extend through different parts of Tinker AFB.

The USACE completed a study in 2002 to map floodplains on Tinker AFB. Crutcho Creek and its tributaries are all bounded by the 500-year floodplain, which affects approximately 462 acres of land on the base, much of which is associated with Crutcho Creek.

With regard to the existing 507 ARW aircraft parking ramp area of the installation, although no buildings are located in the 500-year floodplain, the entire aircraft parking ramp and associated detention basins are located in the 500-year floodplain of East Crutcho Creek. East Crutcho Creek originates east of the 507 ARW parking ramp, extends under the parking ramp through a concrete culvert, and terminates into Crutcho Creek on the base approximately 1.25 miles northwest of the 507 ARW parking ramp.

In 2013, the USACE completed a hydrology and hydraulics study for activation of the KC-46A maintenance depot. The study identified stormwater detention options for discharge to East Crutcho Creek which included modification of the existing Fire Detention Pond as needed and/or constructing a detention basin on the west side of the 507th ramp (USACE 2013).

3.3.5 Biological Resources

3.3.5.1 *Vegetation*

Tinker AFB is located within the Central Great Plains ecoregion of Oklahoma (OFS 2013). The Central Great Plains ecoregion is characterized by rolling grassland prairies and oak savanna habitats. Much of the original native tallgrass and mixed grassland once surrounding Tinker AFB was converted into cropland and rangeland, with woody vegetation and invasive plant species encroaching into and eliminating most of the remaining grassland areas. Remaining areas of prairie habitat are rare and isolated (Tinker AFB 2015a).

Tinker AFB is located in a suburban area outside of Oklahoma City, Oklahoma. The base and the area surrounding the base are heavily urbanized, with little unimproved grounds. The airfield and adjacent areas of Tinker AFB are dominated by cool-season, nonnative grasses. Areas outside of the airfield are comprised primarily of improved grounds and include turfgrass and ornamental trees and shrubs. Unimproved grounds include natural woodland and grassland areas, ponds, wetlands, creeks, and other areas where natural vegetation is allowed to grow essentially unimpeded by maintenance activities (Tinker AFB 2015a). See Appendix E for a list of common species known to occur at Tinker AFB. Vegetation management at Tinker AFB is guided by the INRMP, the Installation Development Plan (IDP), and the BASH Plan (Tinker AFB 2005, 2014a, 2015a).

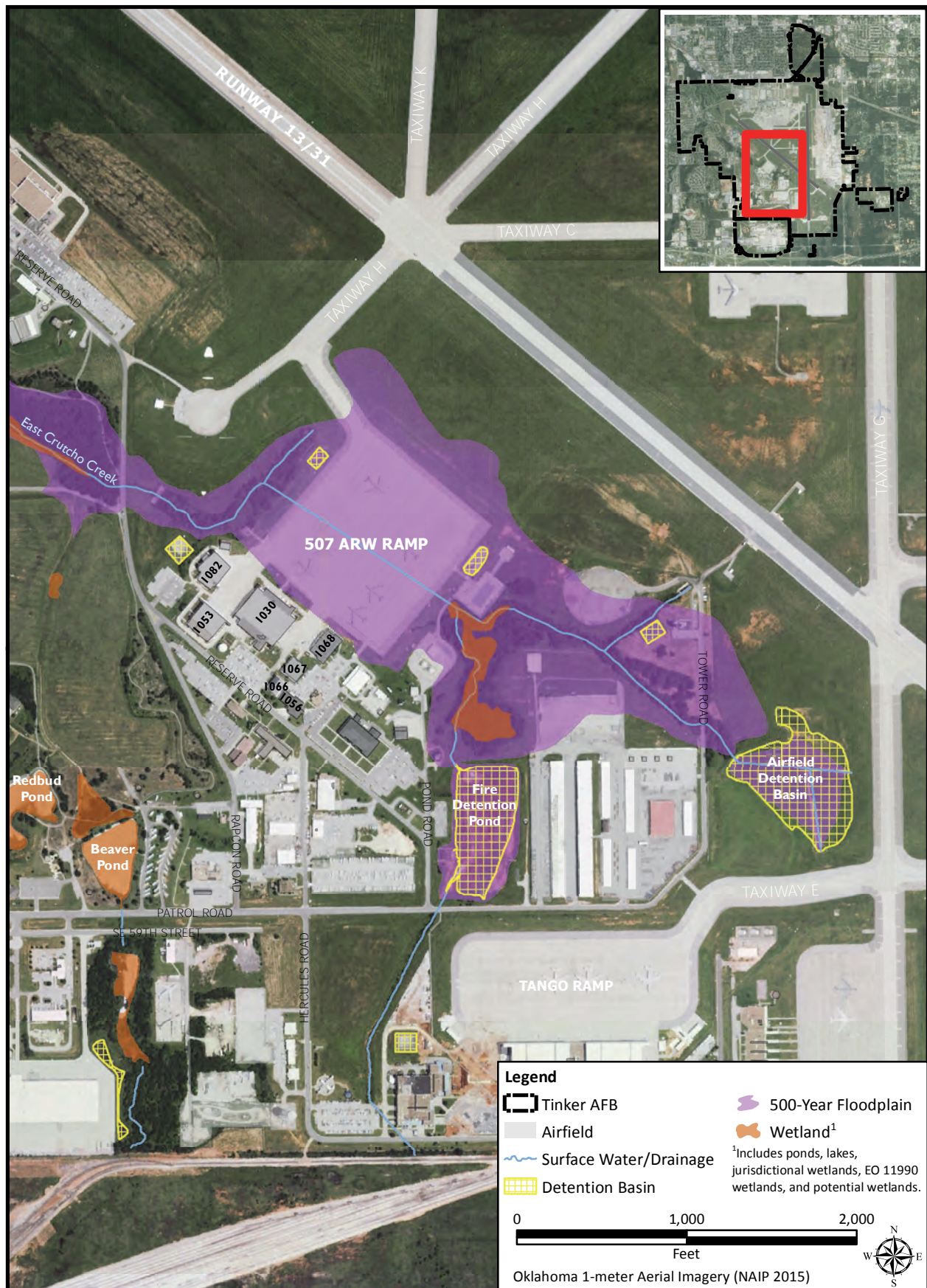


Figure 3-8. Tinker AFB Floodplains

Tinker AFB has created a green infrastructure network. This network provides interconnected areas of habitat, such as wetlands, woodlands, grasslands, and other natural areas of base-wide significance (Tinker AFB 2015a). This green infrastructure network currently covers 1,033 acres.

3.3.5.2 *Wildlife*

Information on wildlife occurring on Tinker AFB is provided in the INRMP (Tinker AFB 2015a). Common wildlife documented on the base includes a variety of mammals, birds, reptiles, amphibians, and fish species. See Appendix E for a list of common species known to occur at Tinker AFB.

3.3.5.3 *Special-Status Species*

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Tinker AFB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Tinker AFB. A submission for Oklahoma County, Oklahoma was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 17 March 2016 (Volume II, Appendix A, Section A.6.3) contains a full copy of the Trust Resource Report (USFWS 2016e). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur within Oklahoma County, Oklahoma (USFWS 2015i). Table 3-29 presents the federally listed species identified through the IPaC and ECOS reviews.

Table 3-29. Federally Listed Species that Could Occur in Oklahoma County, Oklahoma

Common Name	Scientific Name	Status		Occurrence at Tinker AFB	USFWS Online Review System
		Federal ^a	State ^b		
Birds					
Whooping crane	<i>Grus americana</i>	FE	-	No	IPaC, ECOS
American peregrine falcon	<i>Falco peregrinus anatum</i>	FR	-	No	IPaC, ECOS
Piping plover	<i>Charadrius melodus</i>	FT	-	Yes	IPaC, ECOS
Least tern	<i>Sterna antillarum</i>	FE	-	No	IPaC, ECOS
Red knot	<i>Calidris canutus rufa</i>	FT	-	No	IPaC, ECOS
Fish					
Arkansas river shiner	<i>Notropis girardi</i>	FT	-	No	IPaC, ECOS

^a USFWS

^b Oklahoma Department of Wildlife Conservation (ODWC)

Key: FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; FR – federally recovered species

Source: ODWC 2011a, b, c, d; Tinker AFB 2014, 2015; USFWS 2011b, 2014a, b, 2015d, e; USFS 2016

One federally threatened species and several Oklahoma County State Species of Special Concern have been documented at Tinker AFB. Many birds protected under the MBTA could also occur as residents or migrants near the base. There is no critical habitat on Tinker AFB (USFWS 2015a).

One federally threatened species, the piping plover (*Charadrius melodus*), has been documented at Tinker AFB. This documentation was the result of a bird/aircraft strike in 2009. USFWS officials

were contacted, and the plover carcass was sent to the Smithsonian to verify identification. No other piping plovers have been observed loafing or foraging on Tinker AFB property.

According to the Oklahoma Natural Heritage Inventory (OHNI), there are no other records of piping plover occurrences in Oklahoma County and only two nests have ever been recorded in Oklahoma (Boyd 1991). According to the USFWS, “in 1987 and 1988 piping plovers nested at Optima Reservoir, Oklahoma (67 FR 176 57638, September 11, 2002). Optima Lake is located on the Beaver River in Texas County (i.e., in the panhandle of Oklahoma), approximately 250 miles northwest of Tinker AFB.

Most records for the piping plover in Oklahoma are for birds migrating across the state from north to south or south to north. According to the USFWS-approved Oklahoma Comprehensive Wildlife Strategy, in the Cross Timbers Region, this species is only known from “Large River” and “Herbaceous Wetland” habitats, neither of which occur on Tinker AFB. The potential for piping plover to forage, nest, or loaf in this region is listed as low, with the species considered rare (ODWC 2005). No other federally endangered bird species have been observed on or flying over Tinker AFB (Tinker AFB 2015a). In 2008-2009, Virginia Polytechnic Institute and State University conducted a comprehensive avian study, seasonally evaluating 44 circular variable radius plots on Tinker AFB. Although this study documented 137 avian species on Tinker AFB, no piping plovers were identified (St. Germain 2010).

Several State Species of Special Concern have been documented on Tinker AFB. These species include five birds (barn owl [*Tyto alba*], burrowing owl [*Athene cunicularia*], migrant loggerhead shrike [*Lanius ludovicianus migrans*], piping plover, and Swainson’s hawk [*Buteo swainsoni*]); one lizard (Texas horned lizard [*Phrynosoma cornutum*]); and one plant (Oklahoma penstemon [*Penstemon oklahomensis*]) (Tinker AFB 2015a).

More than 380 Texas horned lizards have been documented within the extreme southwestern portion of the base in an area designated as Reserve 3. Reserve 3 is not near the facility and infrastructure projects described in Chapter 2. Biologists and researchers at Tinker AFB, Southern Illinois University, and Oklahoma State University have worked cooperatively since 2003 to conduct studies to provide a better understanding of the horned lizard ecology and life history at Tinker AFB. Radio-telemetry mark-recapture studies are performed to track lizard distribution, habitat use, and population status, as well as survival and density estimates on base (Tinker AFB 2015a).

The Oklahoma penstemon is endemic to Oklahoma and North Texas and is found at several locations on Tinker AFB. The Oklahoma penstemon is located in fragmented remnant native prairie communities, primarily in the southeast portion of the base, including the airfield, Cyber Engineering Installation Group (at Southeast 59th Street), and within the leased land immediately adjacent to and south of Landfill 6. Another small population occurs in the northeastern portion of Glenwood. However, the species does not occur near the facilities and infrastructure projects in Chapter 2.

Tinker AFB has conducted evaluations at the base to identify all special status species habitat within the base boundary (Tinker AFB 2015a). These evaluations also included habitat for plants and wildlife that Tinker AFB has identified as species at risk. Species at risk include the special status species described above, as well as additional species identified by base natural resource personnel. The INRMP lists the forested floodplain west of the 507 ARW ramp as an area of species at risk habitat and designates it as black willow shrubland. This shrubland provides habitat for migratory and resident bird populations (Tinker AFB 2015a).

3.3.5.4 Wetlands

There are 42 identified wetland areas on Tinker AFB, encompassing approximately 38 acres of land (Tinker AFB 2015a). A study was conducted in 2003 to evaluate the health and quality of these wetland areas (Tinker AFB 2015a). Only two wetlands (Greenway and Prairie Ponds) were classified as high quality wetlands based on the Ohio Rapid Assessment Method for Wetlands and the USEPA's Rapid Bioassessment Protocol. Both of these wetland areas are located outside of the facilities and infrastructure projects as described in Chapter 2 (see Figure 3-9).

During the early planning stages of this project, a potential wetland area was identified west of the 507 ARW aircraft parking ramp and adjacent to an unnamed tributary to East Crutcho Creek. An evaluation by USACE regulatory personnel on 3 March 2016 determined this area was not a wetland but a forested floodplain; the unnamed tributary to East Crutcho Creek was classified as a jurisdictional waterway (USACE 2016).

3.3.6 Cultural Resources

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties.

3.3.6.1 Architectural Resources

A number of architectural inventories have been conducted on Tinker AFB (Tinker AFB 2011), including a recent survey to determine Section 110 eligibility for select buildings greater than 50 years of age. Tinker AFB has five buildings that are NRHP-eligible individually and one NRHP-eligible historic district with seven contributing buildings (Table 3-30).

Table 3-30. NRHP-Eligible Buildings at Tinker AFB

Building Number	Construction Date	Description	Individually Eligible?	Historic District
1	1942	Depot Supply	Yes	No
208	1942	Steam Plant	Yes	No
230	1942	Airplane Repair Building	Yes	No
240	1942	Flight Test Hangar/Base Operations	Yes	No
3001	1943	Douglas Assembly Building	Yes	Douglass Cargo Aircraft Manufacturing
3105	1943	Paint Building	No	Douglass Cargo Aircraft Manufacturing
3113	1943	Woodworking Building	No	Douglass Cargo Aircraft Manufacturing
3202	1943	Fire Pump Station	No	Douglass Cargo Aircraft Manufacturing
3203	1943	Fire Protection Water Storage Tank	No	Douglass Cargo Aircraft Manufacturing
3204	1943	Switch Gear House	No	Douglass Cargo Aircraft Manufacturing
3303	1943	Pump House	No	Douglass Cargo Aircraft Manufacturing
4029	1951	Combat Control Center	Yes	No

Source: Tinker AFB 2011

3.3.6.2 Archaeological Resources

100 percent of Tinker AFB property has been surveyed for archaeological resources (Tinker AFB 2011), resulting in the identification of four archaeological sites. Three of the sites are eligible for listing in the NRHP. The sites are located on the western portion of the base

outside the potential area of effect for the proposed MOB 3 beddown. SHPO has concurred with the findings of past archaeological surveys (Tinker AFB 2011).

3.3.6.3 *Traditional Resources*

Pursuant to Sections 101(d)(6)(B) and 106 of the NHPA and implementing regulations at 36 *CFR* Section 800.2(c)(2), the USAF is consulting on a government-to-government basis with five tribes that are culturally affiliated with the installation. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, have been asked to provide information on any properties to which they attach religious and cultural significance. The USAF will use this information to determine whether any such resources are eligible for the NRHP, and if so, identify measures that can be taken to resolve any adverse effects on them.

3.3.7 **Land Use**

Tinker AFB encompasses 5,580 acres and is located entirely within the boundaries of Oklahoma County, Oklahoma. The main portion of Tinker AFB is located within the incorporated city limits of Oklahoma City. Centered 10 miles southeast of downtown, Tinker AFB is bordered to the north by Interstate 40 and 29th Street, to the east by Douglas Boulevard, to the south by 74th Street, and to the west by Sooner Road. Incorporated areas immediately surrounding the base include Midwest City to the north and Del City to the northwest. The majority of the land surrounding the base can be characterized as moderate-density urban developed, with areas of undeveloped land south of the installation (Tinker AFB 2005).

3.3.7.1 *Base*

Since World War II, land use patterns at Tinker AFB have evolved as missions and requirements have changed or expanded. Tinker AFB's runways separate the base into several distinct, functional land use areas. The airfield land use classifications comprise the majority of the existing land use on-base. Industrial land uses are consolidated in a few contiguous areas; the largest is the Northside Industrial District located between Arnold Street and the northern base boundary. Additional industrial areas are located in the South Forty District and the Eastside Depot Maintenance District. Administrative land uses are located along Arnold Street, with additional areas located in other land use classifications throughout the base. Community (commercial) facilities are located in the Northside Industrial District and the West Community District. The community (service) land use is predominant in the West Community District and in one area in the Eastside Depot Maintenance District. Housing is located in the western section of the base in and adjacent to the West Community District, separate from noise generating activities, but convenient to community service facilities. Outdoor recreation uses are located in the West Community District and in the northwest corner of the base. The remainder of the existing land use consists of open space. Even though open space is a predominant land use (996 acres), the majority of its potential use is constrained by IRP sites, environmental districts, and airfield buffers (Tinker AFB 2005).

3.3.7.2 *Surrounding Areas*

As shown on Figure 3-6, the area surrounding Tinker AFB is mostly developed, consisting primarily of residential areas and mixed commercial uses. The area south of the base is less developed and includes the nearby Lake Stanley Draper and outdoor recreation areas. Midwest City is primarily composed of residential areas with small businesses (e.g., convenience stores, automotive repair shops, and rental storage) in neighborhoods adjoining the base.

Del City is also composed primarily of residential areas and small businesses. Four elementary schools, three junior high schools, three high schools, and one junior college are within 3 miles of the northern base boundary. No major agricultural operations are present on base or within the immediate area surrounding Tinker AFB (USAF 2006). A major industrial site, the former General Motors Assembly Plant, is at the southern base boundary. Tinker AFB has been converting the former plant into a maintenance facility called the Tinker Aerospace Complex.

According to the installation AICUZ study, the estimated off-base area affected by noise levels of 65 dB $L_{A_{dn}}$ or greater is 2,586 acres (USAF 2006) (see Section 3.3.1.1). This includes land use within the Tinker AFB CZs and APZs. Incompatible land use includes residential and school use. Residential uses exist within the 70 to 79 dB $L_{A_{dn}}$ noise exposure zone north of 29th Street in Midwest City. Residential uses also exist within the 70 to 79 dB $L_{A_{dn}}$ noise exposure zone to the north of the base. Homes that have the recommended measure in place to reduce interior noise levels are considered compatible (USAF 2006).

In 2008, a JLUS (sponsored by the Association of Central Oklahoma Governments) was prepared for Midwest City, Del City, Oklahoma City, Spencer, Choctaw, Nicoma Park, Oklahoma County, Cleveland County, Oklahoma Strategic Military Planning Commission, and Tinker AFB (ACOG 2008). The purpose of the JLUS was to evaluate the current status of the implementation of recommendations issued in the 2006 AICUZ study for Tinker AFB and to recommend additional actions by local governments to improve land use decisions that could affect the missions of Tinker AFB.

3.3.8 Infrastructure

3.3.8.1 Potable Water System

Tinker AFB receives potable water from three different sources. Groundwater wells drawing from the Garber-Wellington mudstone/sandstone aquifer supply approximately 6.5 MGD, at 75 percent of their rated capacity. The Lake Stanley Draper water system serves as a secondary source of water and an additional 5 MGD is available from the Oklahoma City water system. The water storage capacity of the five elevated tanks located at Tinker AFB is 3.0 MG (Tinker AFB 2005). Current average daily water use is 0.75 MGD, which is 12 percent of the base system capacity from the wells and 7 percent of total available supply. The general condition of the water supply and distribution system is good (Tinker AFB 2005).

3.3.8.2 Wastewater

The industrial wastewater system on the Tinker AFB provides adequate collection of wastewater from industrial facilities and activities and treatment as required prior to discharge to Oklahoma City's sanitary sewerage system. The industrial wastewater system typically receives and treats 0.9 MGD of wastewater. After treatment effluent from the plant combines with domestic wastewater and is released to the Oklahoma City municipal WWTP (Tinker AFB 2005).

The general condition of the sanitary sewer collection system is fair. Sewer mains need to be slip-lined or replaced due to consistent pipe failures. In certain cases, full replacement and upsizing of sewer pipes are needed to accommodate future development. The Tinker AFB sanitary sewerage consists entirely of a wastewater collection system. There are no septic systems, and the base no longer operates a WWTP (Tinker AFB 2005). In 2015, Tinker AFB generated 0.95 MGD in non-industrial wastewater.

3.3.8.3 *Stormwater System*

The storm drainage system at Tinker AFB is a combination of natural and built features (e.g., curbs and gutters, culverts, and pipes). These features convey stormwater to two primary areas: Crutch Creek and the South Forty District. Due to poor percolation qualities of soil on Tinker AFB, rainfall events can cause surface water problems. Stormwater from the Northside Industrial District and northeast portions of the installation are conveyed to Crutch Creek, while storm water from the west is conveyed to the South Forty. The system of retention ponds and basins in the southern part of the Crutch Creek drainage basin (South Forty District) works well to control potential flooding. The South Forty District has natural and constructed retention areas to control runoff and flooding (Tinker AFB 2005). The deicing detention basin located on the west side of the 507 ARW ramp is no longer used as part of the current deicing procedures at Tinker AFB.

3.3.8.4 *Electrical System*

Oklahoma Gas and Electric (OG&E) Company supplies electrical power to Tinker AFB through a looped 138 kV transmission line. Approximately 76 percent of the single-conductor power lines are underground. Tinker AFB has approximately 72 installed generators that provide backup power to key buildings. Additional backup is provided by an 80-MW natural gas peaking plant and standby generator owned by OG&E. The peaking plant and standby generator provides an isolated secondary power source to the base. The electrical supply to Tinker AFB is adequate, and the electrical distribution system is in good condition (Tinker AFB 2005). Between 2010 and 2014, Tinker AFB averaged approximately 37,059 MWh per month, or 1,218 MWh per day (Tinker AFB 2015c).

3.3.8.5 *Natural Gas System*

Tinker AFB purchases natural gas through a government-wide supply contract administered by Defense Energy Supply Center. Geary Energy is the current natural gas supply contractor. Oklahoma Natural Gas Company delivers natural gas to the base at three metered delivery points, and pressure is regulated at a range of 40 to 50 pounds per square inch gauge (psig). Although the natural gas supply to the installation is adequate to meet existing needs and provide for future expansion, many natural gas lines and valves are old and deteriorated and have been recommended to be replaced and upgraded (Tinker AFB 2005). The current Tinker AFB natural gas demand is 9.7 MMcf per year (Tinker AFB 2015c).

3.3.8.6 *Solid Waste Management*

MSW and C&D waste generated at Tinker AFB is collected and transported off base by a local qualified contractor (Tinker AFB 2003). This waste is currently disposed of at the Southeast Landfill (Permit No. 3555028), which is located approximately 7 miles from the base (ODEQ 2004). The landfill has an expected remaining life of approximately 10 years (Weaver Boos Consultants, LLC-Southwest 2011).

Tinker AFB has an active recycling program in place. Nonhazardous solid waste from military family housing, dormitories, industrial shops, offices, tenants, and contractors is recycled. Recyclable materials are collected and transported by a contractor to a facility off of base property (Tinker AFB 2003). C&D debris generated from specific construction, renovation, and maintenance projects is the responsibility of the contractor performing the construction. The construction contractors are required to minimize their waste, recycle as much as possible, and provide weight and cost data for recycling and disposal.

3.3.8.7 Transportation

Regional access to Tinker AFB is provided by I-40 and I-240, which extend east to west to the north and south of the base. The nearest north-south interstate highway is I-35, which is the major north-south highway corridor in Oklahoma and is less than 5 miles west of the base. Three local arterial roadways (Sooner Road, Southeast 29th Street, and Douglas Boulevard) provide access to the base. Sooner Road is a four-lane arterial that extends along the western border of the base in a north-south direction. Southeast 29th Street is an east-west arterial that provides access to Tinker Gate at Air Depot Boulevard and to Eaker Gate on F Avenue. Douglas Boulevard is a north-south, four-lane arterial that provides access to the base at the Lancer Gate, which is the primary gate on the eastern side of the base (Tinker AFB 2005).

Figure 2-11 shows the primary routes and regional transportation network in the vicinity of Tinker AFB. Where I-40 passes to the north of Tinker AFB, the average daily traffic count was 44,600 vehicles per day in 2014 (OKDOT 2014).

3.3.8.7.1 Gate Access

There are 11 entry gates to Tinker AFB. Two gates, Tinker Gate and Lancer Gate, are open 24 hours per day, 7 days per week. A commercial vehicle gate near Gott Gate provides a single access point for delivery vehicles and heavy equipment entering the base (Tinker AFB 2005).

3.3.8.7.2 On-Base Traffic Circulation

The transportation network at Tinker AFB consists of a series of arterial, collector, and local roadway networks. The arterial network is a system of two- to four-lane roads supporting the majority of traffic circulation onto and around the base. The major arterial roads are Air Depot Boulevard, East Drive, Arnold Street, and Patrol Road. The collector network is primarily a two-lane network that provides access to mission and support facilities. The collectors provide access to the arterial road network. The major collectors for Tinker AFB are McNarney Avenue, Reserve Road, and Mitchell Avenue (Tinker AFB 2005).

3.3.9 Hazardous Materials and Waste

3.3.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Tinker AFB are managed in accordance with AFI 32-7086, "Hazardous Materials Management," and are controlled through the base HAZMART. This process provides centralized management of the procurement, handling, storage, and issuance of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials. The HAZMART process includes review and approval by USAF personnel to ensure users are aware of exposure and safety risks. P2 measures are likely to minimize chemical exposure to employees, reduce potential environmental impacts, and reduce costs for material purchasing and waste disposal.

3.3.9.1.1 Aboveground and Underground Storage Tanks

Four bulk fuel yards (273, 290, 507, and 3700) and the Airborne Warning and Control System (AWACS) Alert Area have a combined capacity of approximately 4.4 MG of JP-8. The 507 ARW fuel yard facility has a capacity of approximately 220,000 gallons of JP-8 and is located southwest of the 507 ARW ramp. The 507 ARW fuel yard is supported by a Type III hydrant system that dispenses JP-8 at up to 1,800 GPM from six outlets located on the 507 ARW ramp. The 507 ARW fuel hydrant system also receives JP-8 via pipeline from the 273 fuel yard.

The 273 fuel yard has a capacity of approximately 3.2 MG of Jet-A. Other ASTs and USTs on the base are used to store JP-5, gasoline, diesel, bio-diesel, used oil, deicing fluid, fuel oil, and hydraulic oil.

All of the tanks at Tinker AFB are managed in accordance with the base Oil and Hazardous Substance Integrated Contingency Plan (ICP) (Tinker AFB 2007), which satisfies the SPCC, FRP, CERCLA, Emergency Planning and Community Right-to-Know Act (EPCRA), Resource Conservation and Recovery Act (RCRA), OSHA, and USAF requirements. This plan addresses storage locations and proper handling procedures for all hazardous materials to minimize the potential for spills and releases. The Tinker AFB Oil and Hazardous Substance ICP also addresses spill response training, procedures, equipment, and notification procedures, as well as the roles, responsibilities, and response actions for all major spills. In 2015, Tinker AFB used approximately 28.4 MG of Jet-A. Tinker AFB primarily receives Jet-A through a commercial pipeline. Jet-A is transported on base to various hydrant systems by pipeline to hydrant outlets, or by four tanker trucks.

3.3.9.1.2 Toxic Substances

The Tinker AFB Asbestos Management Plan establishes procedures and provides guidance for the identification of ACMs; the management of facilities with ACMs; the protection of personnel from the hazards associated with ACMs; and the removal, encapsulation, or enclosure of ACMs (Tinker AFB 2012). An asbestos database is maintained by the CE directorate. The design, maintenance, repair, demolition, renovation, minor construction, or MILCON on existing facilities are reviewed to determine if ACM is present in the proposed work area. For each project on base, ACM wastes are removed by licensed contractors and disposed of in accordance with state and Federal regulations at a permitted off-base landfill.

The LBP Management Plan (Tinker AFB 2010) provides documentation for all LBP management efforts and the mechanism for oversight of the LBP Management Program. Tinker AFB has completed an initial survey of buildings with LBP abatement at all high-priority facilities. The base ensures proper maintenance and monitoring of the LBP still present on the installation. As with ACM, the CE directorate maintains an LBP database to document the location of LBP on Tinker AFB. All demolition, renovation, and maintenance projects are reviewed to determine if lead-containing materials are present in the proposed work area. All LBP wastes are disposed of in accordance with state and Federal regulations. The base complies with all Federal, state, and local requirements regarding LBP activities and hazards. Tinker AFB is reportedly PCB-free (Kline 2015).

3.3.9.2 Hazardous Waste Management

Tinker AFB is classified as an LQG. Typical hazardous wastes generated during O&M activities include aerosol cans, antifreeze and antifreeze filters, batteries, fuel and oil filters, fluorescent lamps, oil-water separator sludge, paint/primer-related wastes, plastic/glass bead blaster filters, rags with oil or fuel, solvents, and used oil and fuels.

Hazardous wastes at Tinker AFB are managed in accordance with Tinker AFB Instruction 32-7004 (Tinker AFB 2015b). This instruction presents information and guidance associated with implementing a hazardous waste management program as required by Federal and state laws and regulations. In 2015, the base generated approximately 1.2 million pounds of hazardous waste, which was disposed of at permitted off-base disposal facilities.

3.3.9.3 *Environmental Restoration Program*

Tinker AFB is divided into four groundwater management units (GMUs). Within these GMUs, there are currently 13 ERP sites. Environmental response actions are planned and executed under the ERP in a manner consistent with CERCLA and other applicable laws. Tinker AFB was listed on the USEPA's National Priorities List in July of 1987.

3.3.10 **Socioeconomics**

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Tinker AFB as they relate to the population, employment, earnings, housing, education, and public and base services. The ROI for this analysis is Oklahoma County, Oklahoma.

3.3.10.1 *Baseline Conditions*

3.3.10.1.1 Population

Population estimates for Oklahoma County totaled 743,145 persons in 2014 (USCB 2014a). Between 2010 and 2014, the county population increased at an average annual rate of 0.8 percent, with a total increase of approximately 24,512 persons over the four-year period (USCB 2010; 2014a). With an estimated population of 600,729 in 2014, Oklahoma City experienced an annual 0.9 percent increase over the 4-year period from 2010 to 2014. The populations of Oklahoma City, Oklahoma County, and the State of Oklahoma have all increased during this timeframe (USCB 2014a) (Table 3-31).

Table 3-31. Population in the ROI for Tinker AFB

Location	2010	2014	Annual Percent Change (2010–2014)
Oklahoma City	579,999	600,729	0.9%
Oklahoma County	718,633	743,145	0.8%
Oklahoma	3,751,351	3,818,851	0.4%

Source: USCB 2010; 2014a

As shown in Table 2-12, the total current personal authorized at the 507 ARW at Tinker AFB is 1,032 persons. This includes 3 military, 27 DoD civilians, 214 dual status technicians, 0 contractors, and 1,002 part-time Reservists. In addition, there are an estimated 397 military dependents and family members associated with the full-time military and civilian personnel associated with the 507 ARW. Only full-time personnel were considered for this analysis, thus the 1,002 part-time Reservists were not considered part of the work force for this analysis.

3.3.10.1.2 Economic Activity (Employment and Earnings)

Per the most recent 2014 county employment data available from the BEA, employment in Oklahoma County totaled 2,281,984 jobs. The largest employment sector in Oklahoma County was government and government enterprises (16.2 percent), followed by retail trade (9.9 percent), and healthcare and social assistance (9.3 percent) (BEA 2015a). Construction accounted for 5.6 percent of total employment. The 2014 unemployment rate reported by the BLS was 4.2 percent in Oklahoma County and 5.9 percent in the State of Oklahoma (BLS 2016a, 2016b). Per capita personal income in Oklahoma County is estimated at \$51,038 (BEA 2015b).

Tinker AFB is an important contributor to the Oklahoma County economy through employment of military and civilian personnel, and through expenditures for goods and services. The base supports 26,000 military and civilian employees and 33,000 secondary jobs. The total economic impact of Tinker AFB statewide is estimated at \$3.51 billion (Tinker AFB 2016).

3.3.10.1.3 Housing

Table 3-32 presents census-derived housing data for Oklahoma County. Oklahoma County had an estimated 324,171 total housing units in 2014, of which 11.2 percent (36,173 units) were vacant (USCB 2014b). Approximately 80 percent of the total housing units in Oklahoma County are located in Oklahoma City. The median value of owner occupied housing units in Oklahoma County is estimated at \$129,800. The median gross monthly rent for occupied units paying rent was \$768 (USCB 2014b).

Table 3-32. Housing Data in the ROI for Tinker AFB, 2014

Location	Housing Units	Occupied	Vacant
Oklahoma County	324,171	287,998	36,173

Source: USCB 2014b

There are three housing options available at Tinker AFB: privatized housing, unaccompanied housing, and housing in the local community. Military family housing at Tinker AFB is privatized and owned by Balfour Beatty Communities. Tinker AFB's lodging operation currently has 139 VQ rooms and 39 TLF rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move. Annual occupancy for lodging is approximately 78 percent (USAF 2015d).

3.3.10.1.4 Education

There are 24 public school districts with 226 schools in Oklahoma County. During the 2015 to 2016 school year, the total enrollment throughout the county was 139,814 students (OKDOE 2016a). School-aged children who reside on base would attend Tinker Elementary School, Jarman Middle School, or Midwest City High School. The three schools are part of the Midwest City-Del City Independent School District. During the 2015 to 2016 school year, the district had a total enrollment of 14,574 students (OKDOE 2016a).

3.3.10.1.5 Public Services

Public services in Oklahoma County include law enforcement, fire protection, EMS, and medical services. Oklahoma County emergency management staff and volunteers are trained in damage assessment, severe storm spotting, public relations, and other specialized skills useful during major emergencies and disasters and not otherwise readily available to Oklahoma County jurisdictions (Oklahoma County 2004). Law enforcement in Oklahoma County includes the Oklahoma County Sheriff's Department and the Oklahoma City Police Department. Oklahoma County has two rural fire protection districts, the Hickory Hills Fire Protection District and the Deer Creek Fire Protection District. Several medical facilities are readily available to serve the communities in Oklahoma City. The nearest hospital to the base, Integris Hospital, is located approximately 9 miles from Tinker AFB.

3.3.10.1.6 Base Services

The 72nd Medical Group offers a full range of wellness and prevention services for all organizations assigned to or located on Tinker AFB. Other base services include a DFAC, recreation and fitness centers, and youth and family services. The Morale, Welfare, and Recreation (MWR) services and facilities are in good condition and support the base population of 26,000 personnel. There are no reported capacity constraints identified with the current dining and recreational facilities. Tinker AFB has three CDCs with approximately 300 spaces. The current wait list of 50 children is anticipated to be reduced once minor renovations to the existing facilities are completed (USAF 2015d).

3.3.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the “affected area” or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB L_{Adn} or greater resulting from a proposed action that are not currently exposed to those noise levels under the baseline conditions, as described under the No Action Alternative (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area.

Table 3-33 provides baseline demographic conditions in Oklahoma County, where Tinker AFB is located. As shown in Table 3-33, Oklahoma County has a higher proportion of minority and low-income populations than the State of Oklahoma and the nation (Figure 3-9).

Table 3-33. Minority and Low-Income Populations Near Tinker AFB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of Oklahoma	3,818,851	1,230,880	32.2%	645,385	16.9%
Oklahoma County	743,145	308,920	41.6%	137,481	18.5%

Source: USCB 2014a; 2014c.

Under baseline conditions, off-base residential areas within the 65 dB L_{Adn} or greater noise contours extend into 13 census block groups. There is an estimated population of 5,264 persons within this area. Of those, 54.8 percent (2,887 persons) are minority and 23.5 percent (1,239 persons) are low-income persons. Table 3-34 presents low-income populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-35 presents minority populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-36 presents the youth and elderly population data comparable to that provided for the low-income and minority populations. Noise-sensitive receptors located within the 65 dB or greater L_{Adn} are shown on Figure 3-9. Two off-base schools, Steed Elementary School and Willow Brook Elementary School, are currently exposed to noise levels of 65 dB L_{Adn} or greater. Steed Elementary School is part of the Midwest City-Del City Independent School district. During the 2015 to 2016 school year, the school had a total enrollment of 425 students (OKDOE 2016b). Willow Brook Elementary School is part of the Oklahoma City Public School District. During the 2015 to 2016 school year, the school had a total enrollment of 523 students (OKDOE 2016b).

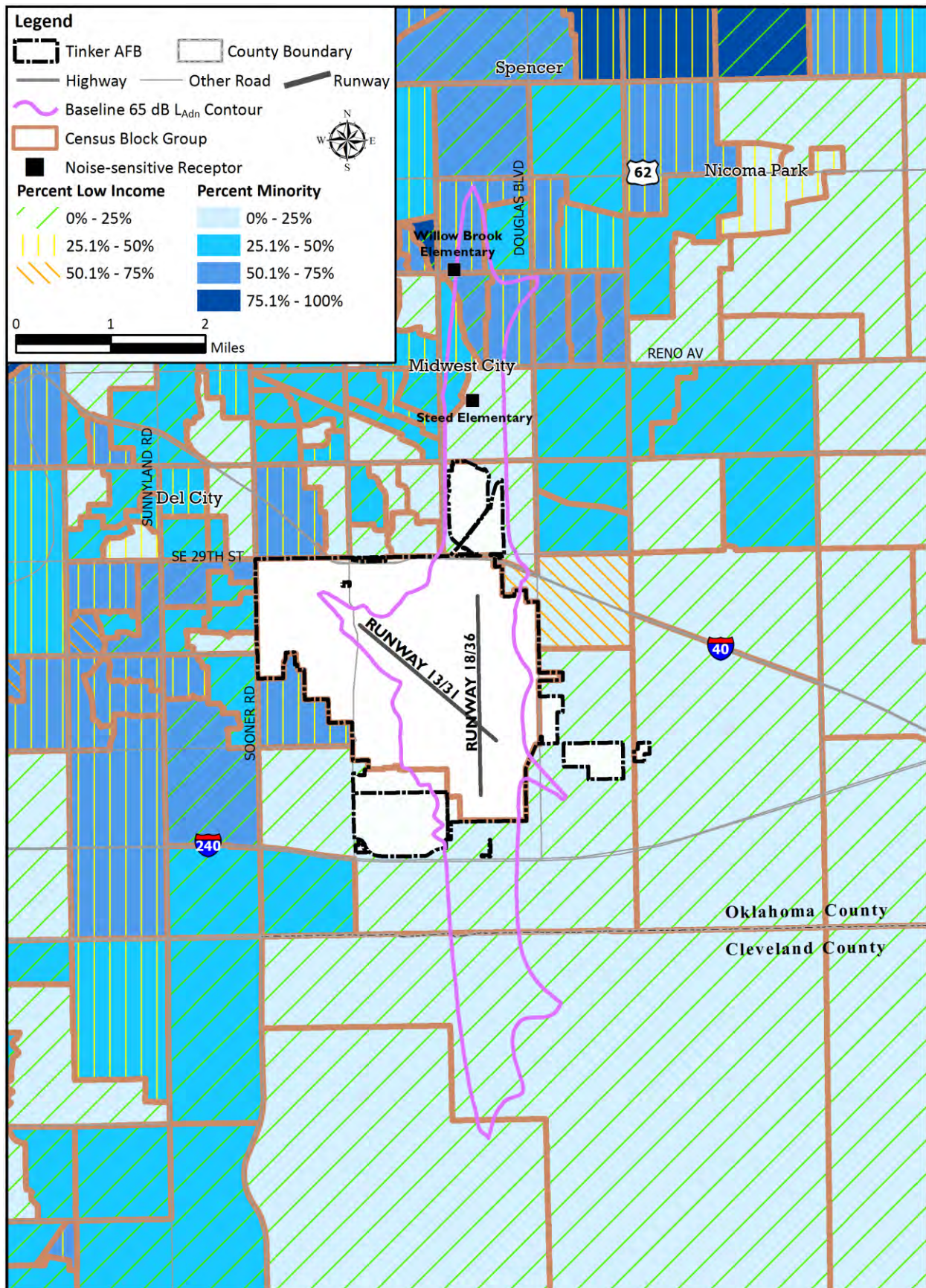


Figure 3-9. Minority and Low-Income Populations Near Tinker AFB

Table 3-34. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
400272023011	1	7.7%
400272023014	0	0.0%
401091074032	0	0.0%
401091074033	4	21.1%
401091076061	24	33.3%
401091077032	88	18.0%
401091077033	38	4.1%
401091080081	387	28.6%
401091080082	85	16.7%
401091080083	401	31.8%
401091080093	0	0.0%
401091080112	6	31.6%
401091080113	205	35.2%
Total	1,239	23.5%

Table 3-35. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Minority	
	Number	Percent
400272023011	2	15.4%
400272023014	0	0.0%
401091074032	0	0.0%
401091074033	6	31.6%
401091076061	8	11.1%
401091077032	129	26.3%
401091077033	431	46.3%
401091080081	825	61.1%
401091080082	175	34.4%
401091080083	898	71.2%
401091080093	5	33.3%
401091080112	4	21.1%
401091080113	404	69.4%
Total	2,887	54.8%

Table 3-36. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Tinker AFB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
400272023011	3	2
400272023014	0	0
401091074032	0	0
401091074033	4	4
401091076061	19	5
401091077032	74	107
401091077033	300	94
401091080081	498	184
401091080082	78	85
401091080083	352	90
401091080093	3	2
401091080112	2	5
401091080113	214	52
Total	1,547	630

Key: Youth = under 18; Elderly = 65 and over.

THIS PAGE INTENTIONALLY LEFT BLANK

3.4 WESTOVER AIR RESERVE BASE

This section describes the conditions of the environmental resources anticipated to be affected by implementation of the proposed KC-46A MOB 3 mission at Westover ARB and, where applicable, in areas surrounding the base. Due to the ongoing conversion of the C-5B fleet to the quieter C-5M aircraft, it was necessary to establish a baseline condition and a No Action Alternative condition. While the No Action Alternative condition represents the complete conversion, the baseline does not and only represents noise resulting from C-5B aircraft. The baseline resource conditions are described to the level of detail necessary to support analysis of the potential impacts that could result from implementation of the proposed KC-46A MOB 3 mission at Westover ARB.

3.4.1 Acoustic Environment

The acoustic environment is the combination of useful or desirable sounds and noise. Noise, which is defined as unwanted sound, has the potential to affect several resource areas evaluated in this EIS. Background information on terms used to describe noise, applicable regulations, and methods used to assess noise impacts in this EIS is contained in Volume II, Appendix B.

In November 2015, updated baseline operations data were provided by pilots, ATC personnel, and other installation POCs. After processing for input into the computer noise model, the information was validated by installation POCs to confirm accuracy. C-5B aircraft based at Westover ARB conduct 1,724 airfield operations per year under baseline conditions. Transient military aircraft conduct 8,243 operations per year, and civilian aircraft conduct 7,044 operations per year. Airfield operations are counted each time an aircraft departs from the runway and each time an aircraft approaches the runway.

Table 3-37 lists maximum noise levels (dB L_{Amax}) generated by based C-5B aircraft, the three most common transient military aircraft, and aircraft representing the most common civilian users of the airfield. The 439 Airlift Wing (AW) has recently begun conversion of its entire C-5B fleet to the C-5M aircraft. The C-5M, which is substantially quieter than the C-5B, is scheduled to be replaced by 2019. C-5B aircraft are 18 dB louder than transient F-16 aircraft during approach at a distance of 1,000 feet, but are 2 dB quieter than an F-16 during departure.

Flying operations at Westover ARB occur primarily on Tuesdays and Thursdays in two blocks of 4 hours each. When evening flights are conducted, they typically occur between 5:00 P.M. and 9:00 P.M. The airport closes at 11:00 P.M., and it is rare that operations occur during the late-night period between 10:00 P.M. and 7:00 A.M. (i.e., acoustic night).

Table 3-37. Aircraft Maximum Noise Levels at Westover ARB

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{max}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
C-5B	2.85 EPR	104	94	78	65
C-21	70.4% NC	70	62	51	42
C-130	932 CTIT	84	77	66	57
F-16	83.5% NC	86	78	66	56
Business jet (Cessna 500)	305 LBS	64	56	46	37
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29

Table 3-37. Aircraft Maximum Noise Levels at Westover ARB (Continued)

Aircraft	Power Setting	A-weighted Maximum Noise Level (L _{max}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
C-5B	92% NF	104	94	79	68
C-21	96% NC	84	76	64	54
C-130	977 CTIT	85	77	66	57
F-16	93% NC	106	98	86	76
Business jet (Cessna 500)	1554 LBS	76	69	58	49
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 439 AW C-5 aircraft currently operating at Westover ARB are B models; representative F-16 aircraft equipped with Pratt and Whitney F100-PW-229 engine.

Key: Power Units: NF = fan speed; NC = engine core speed; CTIT = turbine inlet temperature in degrees Celsius; LBS = pounds of thrust; RPM = revolutions per minute, EPR = Engine Pressure Ratio.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 °F and 70 percent relative humidity.

In accordance with current USAF and DoD policies, contours of L_{Adn} reflecting all ongoing aircraft operations were created using NOISEMAP (Version 7.2). NOISEMAP accounts for the effects of topography on noise, and are calculated for an average annual day (i.e., a day with 1/365th of annual operations). Contours of L_{Adn} reflecting baseline flying operations are shown on Figure 3-10. The 2013 AICUZ update 65 dB L_{Adn} noise contour are also shown as a point of reference (USAF 2013a). Changes in operations since publication of the 2013 AICUZ report include minor increases in C-5B and transient military operations. The effect of the operations tempo increases to noise levels are more than offset by the effects of the changes in noise modeling methods since 2013. The 2013 AICUZ contours were calculated to represent an average busy day, meaning that based flying unit total annual operations are averaged over weekdays only. Because this calculation methodology concentrates aircraft noise in fewer days, the calculated noise level is higher. The methodology used to calculate the 2013 AICUZ contours also differed in that calculations did not take into account the effects of varied topography on the spreading of noise. Therefore, the current noise modeling methods used to calculate baseline noise levels (i.e., modeling average annual day and use of topographic effects) result in lower calculated noise levels than were shown in the 2013 AICUZ report.

The number of on- and off-base acres currently exposed to noise levels greater than 65 dB L_{Adn} is listed in Table 3-38. Residences and other noise-sensitive land uses are considered compatible at noise levels between 65 and 75 dB L_{Adn} only if special construction elements are included to provide increased outdoor-to-indoor noise level reduction. Noise-sensitive land uses are never considered compatible at noise levels greater than 75 dB L_{Adn} .

Table 3-38. Acres Exposed to Noise Resulting from Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels		
	On-Base	Off-Base	Total
65 - 69	320	419	739
70 - 74	369	44	413
75 - 79	208	1	209
80 - 84	158	0	158
≥ 85	84	0	84
Total	1,139	464	1,603

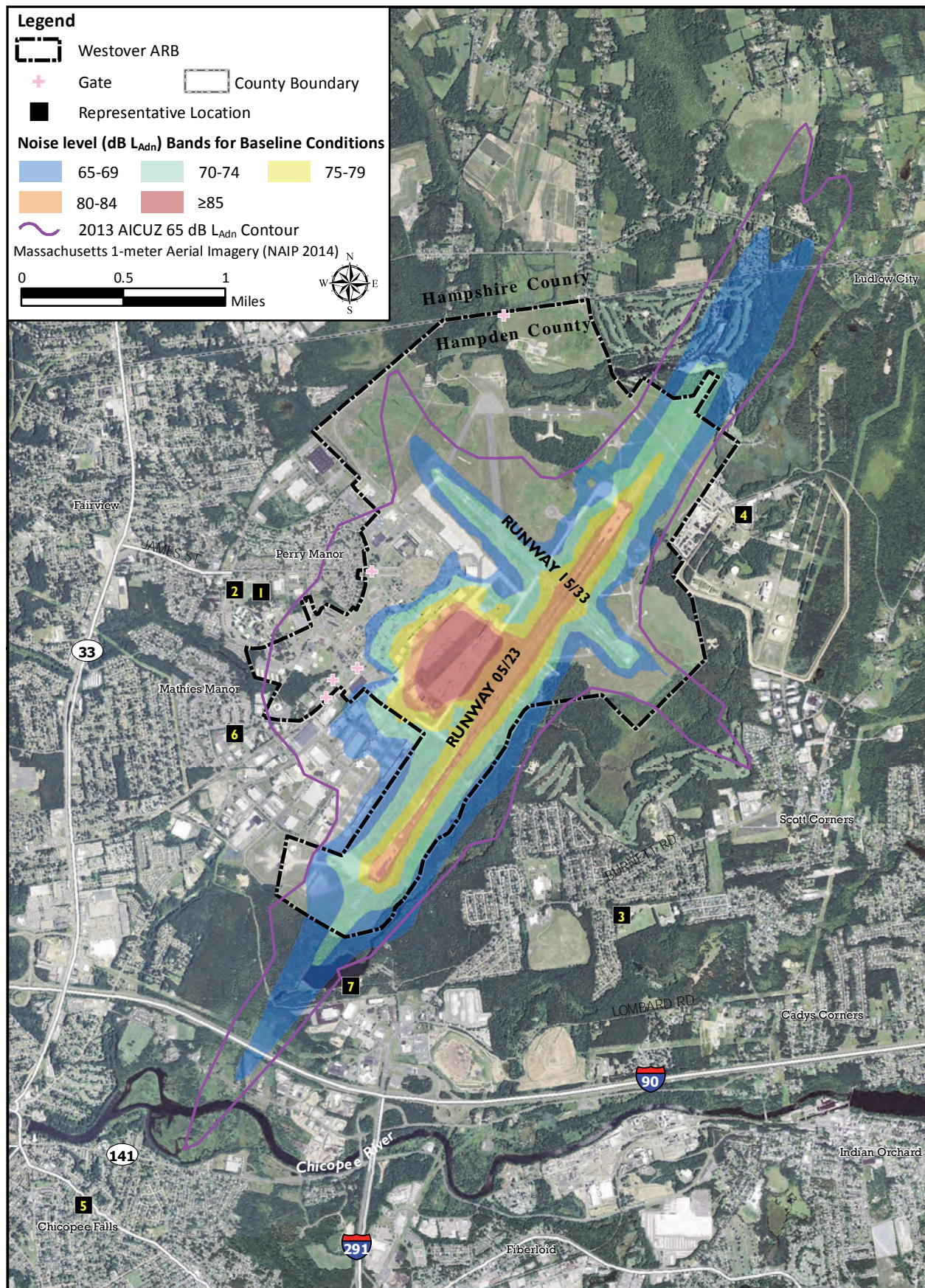


Figure 3-10. Baseline Noise Levels (dB L_{Adn}) at Westover ARB

An estimated 38 people are affected by noise levels greater than 65 dB L_{Adn} under baseline conditions (Table 3-39). Approximately 12 percent of people affected by 65 dB L_{Adn} can be expected to be highly annoyed by the noise.

Table 3-39. Estimated Off-Base Population Exposed to Noise Resulting from Baseline Conditions at Westover ARB

Noise Level (dB L_{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels
65 - 69	38
70 - 74	0
75 - 79	0
80 - 84	0
≥ 85	0
Total	38

Per DoD policy, people exposed to noise levels greater than 80 dB L_{Adn} are most at risk for potential hearing loss (USD 2009). Noise levels greater than 80 dB L_{Adn} do not affect any off-base residents under baseline conditions. The five industrial buildings on Westover ARB exposed to noise levels greater than 80 dB L_{Adn} are all located along the flightline in areas known to be exposed to high noise levels. Hearing loss risk among workers at Westover ARB is managed according to DoD regulations for occupational noise exposure. OSHA and NIOSH occupational noise exposure regulations would continue to be enforced to protect employees of Westover ARB.

Aircraft noise levels (dB L_{Adn}) at several representative locations near Westover ARB are listed in Table 3-40. The locations, which are shown on Figure 3-10, were selected from among many locations that could be considered noise sensitive. Locations near those studied experience similar noise levels. For example, residences located near the schools studied experience noise levels similar to those experienced at the schools. None of the 7 locations studied experience baseline noise levels greater than 65 dB L_{Adn} . The land uses at these locations are all considered compatible with the noise levels to which they are exposed per USAF land use guidelines.

Table 3-40. Cumulative Aircraft Noise Levels Resulting from Baseline Conditions at Representative Locations Near Westover ARB

Location ID	Location Description	Aircraft Noise Level (dB L_{Adn})
1	Bowie School	47
2	Selser School	46
3	Litwin Elementary	46
4	Hampden County Sheriff's Department	55
5	Belcher Elementary	56
6	Porter and Chester Institute	52
7	Chicopee Reservoir Beach	61

Restrictions have been imposed on flying operations at Westover ARB in order to minimize noise impacts. Afterburner-equipped aircraft are instructed to terminate afterburner use as soon as practical after departure. Intersection departures (i.e., aircraft beginning takeoff roll from a location other than the beginning of the runway) are not permitted except in cases where the aircraft would be expected to reach 1,000 feet AMSL prior to reaching the base boundary. Runway 23 is used when winds

allow. Use of Runway 23 directs aircraft over sparsely populated areas north of the installation. From 2011 to 2015, an average of four noise complaints per year has been received by the Public Affairs Office at Westover ARB.

3.4.2 Air Quality

Air emissions produced from construction and operation of the proposed MOB 3 mission at Westover ARB would primarily affect air quality within Hampden County. In Massachusetts, the Massachusetts Department of Environmental Protection (Mass DEP) is responsible for enforcing air pollution regulations. The Mass DEP uses the NAAQS to regulate air quality within Massachusetts. Additional background information on the CAA and the NAAQS is contained in Volume II, Appendix B, Section B.2. Information on regional climate is contained in Volume II, Appendix D, Section D.4.

The Mass DEP enforces the NAAQS by monitoring state-wide air quality and developing rules to regulate and permit stationary sources of air emissions. The Massachusetts Air Quality Regulations and Standards are contained in Title 310, Chapters 6 through 8 and 60 of the *Code of Massachusetts Regulations* (Mass DEP 2016).

3.4.2.1 Region of Influence and Existing Air Quality

The USEPA classifies Hampden County as in attainment of all NAAQS (USEPA 2016a). The County was in nonattainment of the 1997 O₃ NAAQS, but it now attains the 2008 O₃ NAAQS. This change in attainment designation occurred on 6 April 2015 when the USEPA revoked the 1997 O₃ NAAQS and finalized implementation of the 2008 O₃ NAAQS (USEPA 2015a). The urban area of Springfield historically did not attain the NAAQS for CO. However, the urban area of Springfield now attains this standard and is known as a CO maintenance area. Westover ARB is outside of this CO maintenance area to the north by approximately two miles.

3.4.2.2 Regional Air Emissions

Table 3-41 summarizes annual emissions developed for Hampden County in 2011 as part of the NEI process (USEPA 2016b). The majority of emissions within the region occur from (1) on-road and nonroad mobile sources (VOCs, CO, and NO_x), (2) solvent/surface coating usages (VOCs), (3) fuel oil combustion (SO_x), (4) residential wood burning (CO, PM₁₀/PM_{2.5}), and (5) fugitive dust from unpaved roads (PM₁₀/PM_{2.5}).

Table 3-41. Annual Emissions for Hampden County, Massachusetts, 2011

Source Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Stationary Sources	6,783	11,133	3,409	2,365	12,008	2,963	NA
Mobile Sources	4,807	45,959	6,896	46	564	325	1,998,104
Total	11,590	57,092	10,305	2,411	12,572	3,288	1,998,104^a

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Hampden County are incomplete.

Key: CO₂e (mt) – carbon dioxide equivalent in metric tons; NA = not available

Source: USEPA 2016b

3.4.2.3 Westover ARB Emissions

Air emissions at Westover ARB occur from the activities associated with the C-5B 439 AW and transient aircraft operations. The main sources of existing emissions occur from (1) aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite POV commutes, (5) mobile fuel transfer operations, and (6) stationary and area sources. Table 3-44

summarizes estimates of the most recent annual operational emissions generated by Westover ARB (2013 through 2015). These data were developed in part from the *2013 Mobile Air Emissions Inventory for Westover ARB* (AFCEC 2016), *Air Emissions Report – 2013 Yearly Calculations* (Westover ARB 2015a), *2014 GHG Submission Report to the Mass DEP* (Westover ARB 2015b), and activity data collected for 2015 operations. The air quality analysis uses the data in Table 3-42 to define baseline emissions for Westover ARB. Volume II, Appendix D, Section D.4, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs resulting from existing sources at Westover ARB. See Volume II, Appendix B, Section B.2.1.1, for further details regarding GHGs.

Westover ARB operates under a 50 percent Facility Emissions Cap, which requires annual facility emissions to remain below 25 tons per year of VOC or NO_x, or 50 tons per year of any other regulated air pollutant; 5 tons per year of a single HAP; 12.5 tons per year of any combination of HAPs; and 50 percent of any lesser threshold for a single HAP that the USEPA may establish by rule (Mass DEP 2006).

Table 3-42. Annual Emissions from Existing Operations at Westover ARB, 2015

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Aircraft Operations	14.89	144.26	695.19	29.35	36.62	18.64	NA
AGE	1.86	4.55	20.02	0.21	1.01	0.98	NA
GMVs/Nonroad Equipment	0.40	3.84	5.34	0.02	0.49	0.25	1,480
POVs – On Base	0.07	2.03	0.29	0.00	0.03	0.01	181
POVs – Off Base	0.91	36.07	5.79	0.07	0.37	0.14	3,004
Point and Area Sources	1.56	4.00	5.92	0.07	0.46	0.37	5,561
Total Emissions^a	19.70	194.76	732.55	29.71	38.99	20.39	10,227

^a GHG emissions from stationary sources are not available on a county-wide level. Therefore, total GHGs presented for Hampden County are incomplete.

Key: CO₂e (mt) – carbon dioxide equivalent in metric tons; NA – not available.

3.4.3 Safety

The safety resource area applies to activities in the air and on the ground associated with aircraft flight and operation. Flight safety considers the aircraft flight risks, including the potential for bird/wildlife-aircraft strike hazard. Ground safety considers issues associated with O&M activities that support base operations, including fire response. Background information on the regulatory setting and methodology for safety is contained in Volume II, Appendix B, Sections B.3.2 and B.3.3.

3.4.3.1 Flight Safety

Aircraft flight operations at Westover ARB are governed by standard flights rules. Aircrews ensure flight safety when operating at the airfield by complying with all safety and aircraft operating requirements. Westover ARB has had only two Class B mishaps and zero Class A mishaps associated with C-5 operations on or around the airfield in the past 10 years. Both of the Class B mishaps were engine component failures. Neither was due to conditions around/on the airfield or related to bird/wildlife-aircraft strike hazard (Westover ARB 2014b, Westover ARB 2015e). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of \$2 million, and/or destruction of an aircraft. Class B mishaps result in permanent partial disability or

inpatient hospitalization of three or more personnel and/or a total cost of between \$500,000 and up to \$2 million.

The C-5 aircraft and the KC-46A aircraft have the ability to jettison fuel during emergency situations. Data on historical KC-135 operations show that slightly less than two sorties per thousand resulted in a release of fuel (AMC 2013). The ability to land the KC-46A aircraft at a much higher weight than the KC-135 aircraft would be expected to reduce the frequency of fuel releases for the KC-46A. It is therefore expected that KC-46A sorties would experience a lower frequency of fuel releases.

It is the policy of the USAF MAJCOMs to follow AFIs or supplement those AFIs that have been established. These policies require that pilots avoid fuel jettison, unless safety of flight dictates immediate jettison. For example, AMC policy, which covers all USAF tanker assets, requires that, whenever possible, any fuel release from an aircraft must occur above 20,000 feet AGL (AMC 2004, 2012). This policy is designed to minimize potential impacts of fuel jettison events.

The main environmental concern from fuel released from an aircraft is the deposition of fuel onto the ground and/or surface waters and subsequent negative impact on human health or natural resources. The results of a definitive study on the fate of jettisoned fuel from large USAF aircraft (e.g., KC-135) (Deepti 2003) were used to identify a reasonably conservative ground-level fuel deposition value for the KC-46A aircraft. This study used the Fuel Jettison Simulation model developed by the USAF to estimate the ground deposition of fuel from jettison events (Teske and Curbishley 2000). This maximum ground-level fuel deposition value identified for KC-46A aircraft would result in effects that are well below known natural resource and human health thresholds for jet fuel. Therefore, the maximum fuel deposition value expected from KC-46A aircraft would not produce substantial impacts on human health or natural resources.

3.4.3.1.1 Wildlife Strike Hazard at Westover ARB and Vicinity

Bird-aircraft strikes (as well as other animal strikes) on the runway, during takeoffs and landings, and in the airspace have been documented as an ongoing hazard to aircraft. Between 2010 and 2015, Westover ARB recorded 93 bird strikes at the airfield or in the airspace (Westover ARB 2015e). Westover ARB has a BASH Plan that identifies several approaches to reduce BASHs, including grounds maintenance, physical removal of the birds, and improving flight crew awareness. The Flight Safety Office is responsible for BASH monitoring and improvement, and all units are required to abide by the BASH Plan (Westover ARB 2014b). The Westover ARB BASH Plan contains control measures for specific bird hazards that are likely from species common to the area and migratory species. For bird species prevalent in the airfield environs, the installation has developed a set of management tools that include mowing grasslands, application of plant growth regulators, and, if needed, use of pre-emergent herbicides and prescribed burns (USAF 2015a).

3.4.3.2 Ground Safety

Westover ARB, the City of Chicopee, and the Town of Ludlow work together to protect the health and safety of the surrounding populations while also protecting the military mission at the base. Safety zones (CZs/APZs) have been established to delineate recommended surrounding land uses for the protection of people and property on the ground. The primary runway (05/23) and the crosswind runway (15/33) at Westover ARB have CZs encompassing an area 3,000-foot-wide by 3,000-foot-long. APZ I is 3,000-foot-wide by 5,000-foot-long and APZ II is 3,000-foot-wide by 7,000-foot-long. A portion of the CZs (250 acres) are not base property, and portions in Chicopee

are zoned as single-family residential and residential/agricultural. The boundaries of the CZs and APZs have been provided to local governments for their use in planning documents, most recently during the preparation of the 2013 AICUZ Study. While no individuals reside in the CZs, there are a total of 1,084 acres of residential development in the APZs (USAF 2015d).

Westover ARB Fire Emergency Services provides fire and crash response at Westover ARB. It also provides response to structural fires and hazardous material incidents at the base, and is party to mutual-aid support agreements with eight nearby fire departments (Chicopee, Granby, Hamden, Holyoke, Ludlow, South Hadley Districts 1 and 2, and Springfield).

3.4.4 Soils and Water

3.4.4.1 Soil Resources

Westover ARB is located in the New England Province of the Appalachian Highlands physiographic region. The area surrounding the base is characterized by gently rolling terraces that flank the Connecticut River, with elevations ranging from 230 to 245 feet AMSL. The Berkshire Hills bound Westover ARB to the west, with low hills associated with the Worcester Plateau to the east. Soils underlying Westover ARB are primarily of the Urban Land Hinkley-Windsor association. Soils in this association are predominantly covered by urban areas, with most of the foundation for these soils being Hinkley and Windsor soils. Both Hinkley and Windsor soils are coarse textured, comprised of gravel and/or sand. These soil types are very permeable and excessively drained (USDA 1975).

3.4.4.2 Water Resources

3.4.4.2.1 Surface Water

Westover ARB is located in the Chicopee River Watershed, which is the largest of the 27 major drainage basins in Massachusetts (EEA 2016a). The Chicopee River Watershed drains more than 720 square miles of central Massachusetts before connecting with the Connecticut River in the City of Chicopee. Major surface water bodies near Westover ARB include the Connecticut River to the West, the Chicopee River to the South, and Wade Pond to the North. On Westover ARB, Cooley Brook, Stony Brook, and Willimansett Brook are the predominant surface water drainages. Cooley Brook flows south from a large wetland area along the southeastern boundary of the base through the Chicopee Reservoir in Chicopee Memorial State Park, ultimately emptying into the Chicopee River. The reservoir is approximately 16 acres and is less than 1,500 feet from the end of Runway 23 (Westover ARB 1995).

Westover ARB is situated on a local high point, which allows stormwater to flow away from the base. Westover ARB discharges stormwater via ten outfalls under a Multi-Sector General Permit (MSGP) issued on 4 June 2015. Stormwater runoff in the south and southeast part of the base discharges through six outfalls into Cooley Brook. Stormwater runoff from the west side of the base is discharged through one outfall which serves as the headwater for Willimansett Brook. The northern part of Westover ARB discharges through one outfall into Stony Brook. Stony Brook is listed as impaired by *E. coli*, turbidity, and non-native macrophytes on the Massachusetts Integrated List of Waters (EEA 2016b). A TMDL has not been established for Stony Brook (EEA 2016b). Cooley Brook is not identified as impaired on the Massachusetts Integrated List of Waters (EEA 2016b). Outfalls are visually inspected on a quarterly basis. Although the outfall that contributes to Stony Brook (011a) required sampling in the past, Westover ARB has since determined that it is not a significant source of *E. coli* to Stony Brook.

and therefore sampling is no longer required, unless future USEPA permit renewals require repeating the sampling and source assessments.

Westover ARB is not required to meet numeric effluent discharge limits because such limitations are not contained in the MSGP. The MSGP allows for the development of a SWPPP to control pollution contributions to stormwater at Westover ARB. The SWPPP includes an evaluation of potential sources of stormwater pollution, such as outside material storage, potential for spills and leaks, and aircraft deicing operations. As part of the SWPPP, Westover ARB implements a variety of different actions to minimize aircraft deicing fluid pollution.

Westover ARB performs aircraft deicing/anti-icing operations primarily on the East Ramp. The aprons, taxiways, and runways are deiced with potassium acetate (liquid) and sodium acetate (granular). The base uses a non-triazole-based propylene glycol deicing fluid mixed as a 60/40 percent glycol/water ratio. Westover ARB currently uses less than 100,000 gallons of aircraft deicing fluid per year. Westover ARB implements a variety of control practices for aircraft deicing which includes personnel training in the proper application methods to prevent over use of deicing fluid along with the use of new Globemaster deicing trucks with metered and more accurate spray nozzles, fluid heating capabilities and enclosed cabs to apply fluid more effectively. Aircraft deicing effluent from the East ramp is primarily discharged through Outfall 1, where it is partially bioremediated in a submerged flow constructed wetland before discharging to Cooley Brook. The MSGP requires airports that use more than 100,000 gallons of glycol-based aircraft deicing fluid and/or 100 tons or more of urea on an average annual basis to conduct stormwater monitoring. Because the base does not use these chemicals in these quantities, storm water monitoring is not required.

The wastewater discharge permit with the Chicopee Water Pollution Control Authority (CWPCA) also allows for the discharge of aircraft deicing effluent with certain conditions. The conditions require pH to be between 5.5 and 9.5 and the discharge cannot contain any oxygen demanding pollutants (BOD) at a flow rate and/or concentration which will cause interference with the City treatment works (including sludge disposal), or which exceeds any limits established by the superintendent. This permit also stipulates pre-notification and during periods of aircraft deicing discharge to the CWPCA effluent monitoring equipment at sanitary sewer Outfall number 21A be continually operated and appropriately maintained.

3.4.4.2.2 Groundwater

Groundwater below Westover ARB has been identified from a shallow sand and gravel aquifer and a deeper bedrock aquifer. Thickness of the shallow aquifer is generally 25 to 85 feet. This aquifer occurs above lacustrine and glacial till deposits ranging in thickness from 10 to 270 feet. The lacustrine deposits overlie the bedrock aquifer, which is comprised of crystalline and sedimentary rocks.

The depth to groundwater in the shallow aquifer ranges from 5 to 20 feet bgs. Although the shallow aquifer is classified as a non-potable drinking water source, the deeper aquifer is used by nearby residences as a source of drinking water. The depth to water in the deeper aquifer is approximately 150 feet bgs.

Institutional controls associated with ERP sites at Westover ARB have been implemented to prevent exposure from contaminated media. These controls include restrictions against the use of contaminated groundwater and restrictions on the use of shallow groundwater as a potable water supply.

3.4.4.2.3 Floodplains

No FEMA floodplain mapping has occurred at Westover ARB. Streams that flow through Westover ARB and have floodplains mapped outside the base boundary include Stoney Brook and Cooley Brook. Stoney Brook is located on the northeast corner of the base and Cooley Brook flows southwest along the southeast border of the base. A GIS analysis was performed using the FEMA FIRM 100-year base floodplain elevations for Stoney and Cooley Brooks. In compliance with EO 13690, an additional three feet was added to those elevations to identify the locations of areas that have an elevation of three feet above the 100-year floodplain. These locations were then plotted using digital elevation models to identify areas near the existing 100-year floodplain that were greater than the 100-year floodplain base elevations and less than or equal to the 100-year plus three feet elevation. The results are shown on Figure 3-11.

3.4.5 Biological Resources

3.4.5.1 Vegetation

Westover ARB is located within the Eastern Broadleaf Forest (Oceanic) Province (Bailey 1995). This ecoregion is characterized by temperate deciduous forests dominated by tall, broadleaf trees. Historically, the forests in the area of Westover ARB were dominated by white oak (*Quercus alba*) and red oak (*Quercus rubra*). However, these areas were logged and cleared for agricultural uses (e.g., row crops and tobacco) in the 1800s. Farming and urban development have resulted in limited forest acreage in the vicinity of the base.

Turf grasses and various broad-leaf weeds are the dominate vegetation type in the improved areas of Westover ARB. A variety of shrubs and trees are also present within the improved areas on Westover ARB. Deciduous woodlands, native grasslands, and open wetlands are present in the unimproved areas of the base. Appendix E contains a list of common species known to occur at Westover ARB. Vegetation management at Westover ARB is guided by the INRMP, the IDP, and the BASH Plan (Westover ARB 2014a, 2014b, 2014c).

3.4.5.2 Wildlife

Information on wildlife occurring on Westover ARB is provided in the INRMP (Westover ARB 2014a). Wildlife habitat within the improved and semi-improved areas on Westover ARB is limited due to the extensive development (i.e., much of the native vegetation has been disturbed or replaced with managed landscapes). However, a variety of mammal, bird, amphibian, reptile, and fish species have been observed within or in the vicinity of unimproved grounds. Appendix E contains a partial list of species known to occur at Westover ARB.

3.4.5.3 Special-Status Species

Two USFWS online review sources (IPaC and ECOS) were reviewed to identify federally listed species with the potential to occur on or within the vicinity of Westover ARB. The USFWS's IPaC online system was accessed on 13 January 2016 to identify current USFWS trust resources e.g., migratory birds, species proposed or listed under the ESA, inter-jurisdiction fishes, specific marine mammals, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur in the vicinity of Westover ARB. A submission for Hampden County, Massachusetts was completed to cover the area within the ROI for biological resources. The USFWS Section 7 letter dated 29 March 2016 (Volume II, Appendix A, Section A.6.4) contains a full copy of the Trust Resource Report (USFWS 2016f). Additionally, a special status species list was obtained via the USFWS's ECOS to identify species with the potential to occur in Hampden County, Massachusetts. Table 3-43 presents the federally listed species identified through the IPaC and ECOS reviews.

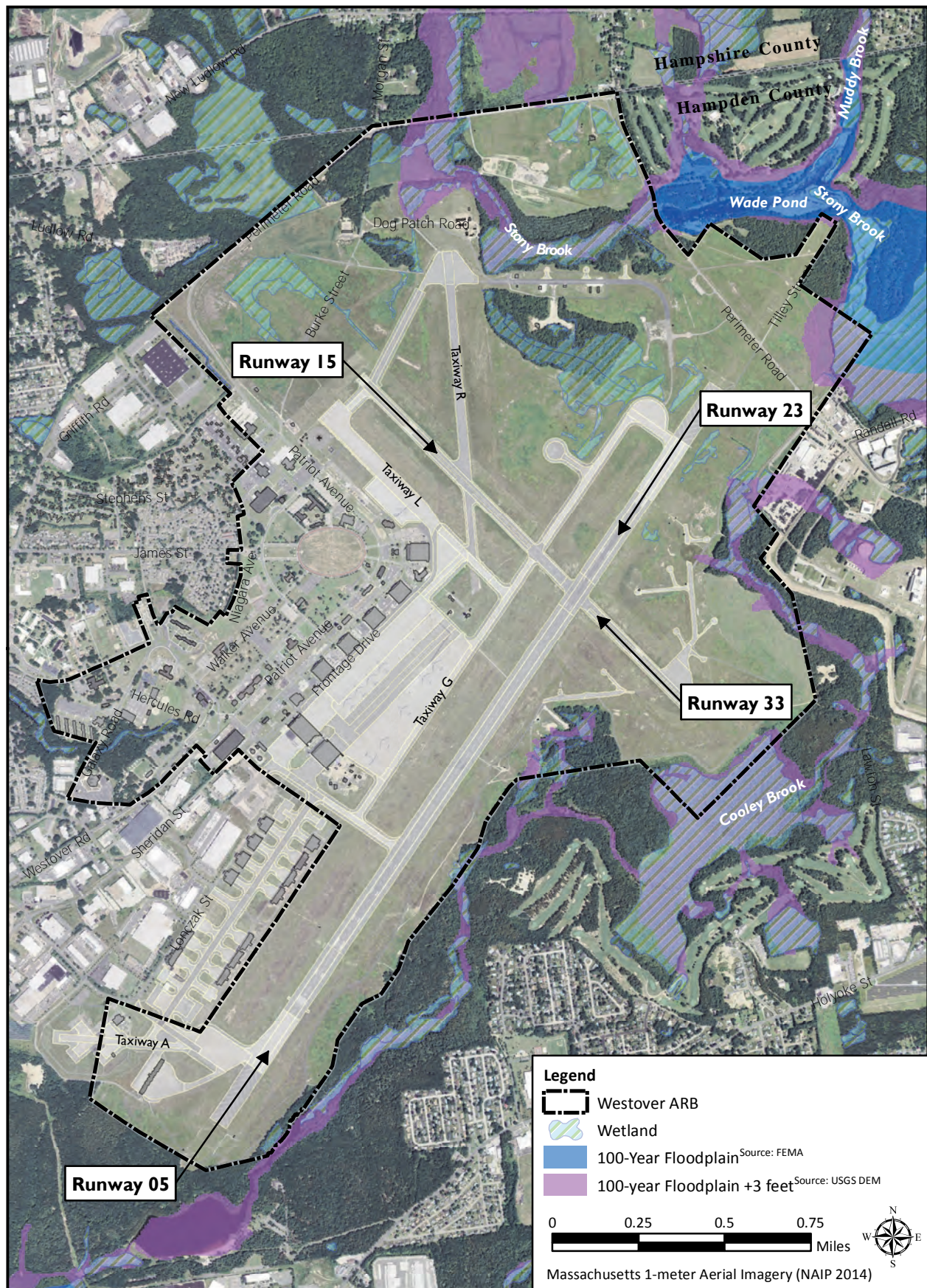


Figure 3-11. Westover ARB Water Resources

Table 3-43. Federally Listed Species that Could Occur in Hampden County, Massachusetts

Common Name	Scientific Name	Status		Occurrence at Westover ARB	USFWS Online Review System
		Federal ^a	State ^b		
Clams					
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	FE	E	No	ECOS
Flowering Plants					
Small whorled pogonia	<i>Isotria medeoloides</i>	FT	E	No	IPaC, ECOS
Mammals					
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT	E	No	IPaC, ECOS

^a USFWS^b Massachusetts Division of Fisheries and Wildlife (MDFW) Natural Heritage and Endangered Species Program**Key:** FT – listed as threatened under the ESA; FE – listed as endangered under the ESA; E – Massachusetts endangered**Source:** USFWS 2015b, 2015d, 2015f, 2015j; Westover ARB 2014a, MDFW 2016

No federally listed threatened or endangered species are known to occur at Westover ARB; however, several state-listed species have been documented from the base. Many birds protected under the MBTA could occur as residents or migrants near Westover ARB. There is no critical habitat known to occur on base (USFWS 2015a).

No aquatic habitat for the dwarf wedgemussel occurs on base. Additionally, there is no known suitable habitat for the small whorled pogonia at Westover ARB. Habitat for the small whorled pogonia includes older hardwood stands of beech, birch, maple, oak, hemlock, and hickory that do not occur on base. While potential foraging habitat may be available, no known roosting habitat for the northern long-eared bat occurs on base. The northern long-eared bat was not detected during base-wide surveys completed in 1995 (Westover ARB 2014a).

Several state-listed plant and animal species and suitable habitats were documented on Westover ARB during a 1995 survey conducted by the Massachusetts Division of Fisheries and Wildlife (MDFW). Included among the species documented were eight birds, three amphibians, four reptiles, one invertebrate, and three plants (Westover ARB 2014a).

Birds – State-listed bird species observed include the upland sandpiper (*Bartramia longicauda*), grasshopper sparrow (*Ammodramus savannarum*), vesper sparrow (*Pooecetes gramineus*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), blackpoll warbler (*Dendroica striata*), Cooper's hawk (*Accipiter cooperii*), and sharp-shinned hawk (*Accipiter striatus*). The upland sandpiper, grasshopper sparrow, and vesper sparrow were documented in the native grassland communities within the unimproved grounds at Westover ARB. Raptors species (the northern harrier, Cooper's hawk, and sharp-shinned hawk) were observed during the fall, when there is an influx of migrant raptor species. The loggerhead shrike and blackpoll warbler were observed foraging or migrating through the base (Westover ARB 2014a).

Amphibians – State-listed amphibian species observed include the blue-spotted salamander (*Ambystoma laterale*), four-toed salamander (*Hemidactylium scutatum*), and eastern spadefoot toad (*Scaphiopus holbrookii*). Both salamander species were documented within the forested wetlands on Westover ARB (Westover ARB 2014a). Suitable habitat for the eastern spadefoot toad was identified on base (Westover ARB 2014a). The toad species requires dry, sandy loam soils characteristic of pitch pine barrens, coastal oak woodlands, or sparse shrub growth, interspersed with temporary ponds (MDFW 2015). This could include the pitch pine/scrub oak habitat on the base.

Reptiles – State-listed reptile species observed include the spotted turtle (*Clemmys guttata*). The spotted turtle was documented in the northern forested wetlands on the base. While species were not observed, suitable habitat was identified for the wood turtle (*Clemmys muhlenbergii*), hognose snake (*Heterodon platirhinos*), and eastern box turtle (*Terrapene carolina*). Suitable

habitat for the wood turtle, eastern hognose snake, and eastern box turtle could occur within wooded areas on Westover ARB (Westover ARB 2014a).

Invertebrate – One state-listed invertebrate species, the pine barrens zanclognatha moth (*Zanclognatha marta*), has been documented within the pitch pine/scrub oak habitat on base (Westover ARB 2014a).

Plants – State-listed plant species observed include the Hartford fern (*Lygodium palmatum*), wild lupine (*Lupinus perennis*), and large whorled pogonia (*Isotria verticillata*). The Hartford fern has been identified within several forest stands on Westover ARB. The wild lupine has been documented within the open grassland areas in the northeastern portion of the base. Two colonies of the large whorled pogonia occur within the wooded areas on Westover ARB (Westover ARB 2014a).

3.4.5.4 *Wetlands*

No wetlands occur near the facilities and infrastructure projects described in Chapter 2. A base-wide wetlands survey conducted in June–July 1997 identified and delineated jurisdictional wetlands present on Westover ARB. Thirty-three wetlands totaling approximately 144 acres were documented, representing all federally regulated wetland resources on the base (Westover ARB 2014a). The wetlands are located in a variety of landscapes ranging from forested areas to open grasslands, with the largest amount of wetland acreage connected to the Stony Brook wetland complex. Figure 3-11 shows the location of the Jurisdictional Waters and Wetlands on Westover ARB.

3.4.6 **Cultural Resources**

Cultural resources are historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, and traditional resources. Cultural resources that are eligible for listing on the NRHP are known as historic properties.

3.4.6.1 *Architectural Resources*

Numerous architectural inventories have been conducted on Westover ARB (Westover ARB 2004a). Westover ARB identified the Westover ARB Historic District (Historic District) as eligible for listing on the NRHP. This evaluation included 39 contributing resources, including seven individually-eligible buildings. On 1 November 1995, the Massachusetts Historical Commission (MHC) concurred with the Historic District determination of eligibility under Criteria A and C for its associations with military operations during World War II and the Cold War era, and for the survival of historic building and structure types representative of air base design from those historic periods (MHC Opinion, 1 November 1995; MHC Inventory Form CHI.AA/LUD.G). The MHC is the Commonwealth of Massachusetts' SHPO.

The period of significance for the Historic District is defined as 1939-1974, after which the boundaries of the air base started to diminish as land was sold back to the local community. Since the boundary of the Historic District was not identified in the initial Historic District NRHP nomination, the MHC recommends that Westover ARB adopt the 1974 installation boundary as the Historic District boundary in an update of the nomination. Only buildings and structures that were more than 50 years old in 1995 are identified as contributing to the Historic District in the current MHC inventory forms. However, for the purposes of this undertaking, all buildings and infrastructure dating to the period of significance within the former 1974 Westover ARB boundary are considered as contributing to the Historic District, unless evaluated otherwise.

3.4.6.2 Archaeological Resources

Reconnaissance surveys for archaeological resources have been conducted on Westover ARB since 1981 (Westover ARB 2004a). A 1981 survey identified 11 areas with the potential to contain archaeological sites dating to the prehistoric and historic periods (Cox 1981). Based on subsurface testing, four prehistoric archaeological sites (19HD58, 19HS214, 19HD219, 19HD223) and one historic archaeological site (Cooley Brook site) were identified. A subsequent 1994 intensive archaeological survey of 16 areas within Westover ARB determined that site 19HD58 no longer exists on the installation, sites 19HD214 and 19HD219 are not eligible for the NRHP, and site 19HD223 and the Cooley Brook site are potentially eligible for the NRHP (Jones et al. 1994).

In addition to the identification of the known sites, the 11 archaeologically sensitive areas identified in the previous surveys are considered to have the potential for significant archaeological resources. These areas are located around the perimeter of the installation, approximately 1 mile from the 439 AW parking ramp and the area of potential effect (APE).

3.4.6.3 Traditional Resources

Pursuant to Sections 101(d)(6)(B) (54 *USC*. 302706) and 106 (54 *USC*. 306108) of the NHPA, its implementing regulations at 36 *CFR* § 800.2(c)(2), EO 13175, Department of Defense Instruction (DoDI) 4710.02, and AFI 90-2002, the USAF is consulting on a government-to-government basis with five tribes that are culturally affiliated with the installation's lands. These tribes, listed in Table A-1 in Volume II, Appendix A, Section A.3, have been asked to provide information on any properties to which they attach religious and cultural significance. In consultation with the tribes, the USAF will determine whether any such resources, if identified, are eligible for listing on the NRHP. If historic properties of religious and cultural significance are present within the direct or indirect APEs, the USAF will identify measures that can be taken to avoid and minimize any potential adverse effects on such properties.

3.4.7 Land Use

Westover ARB is a joint-use military and civilian airfield located in western Massachusetts. The installation consists of approximately 2,100 acres of land in the City of Chicopee and the Town of Ludlow. Granby and South Hadley are located to the north in Hampshire County, and the City of Springfield is located to the south. Westover ARB is partnered with the Westover Metropolitan Airport under a joint-use agreement with the Westover Metropolitan Development Corporation, a nonprofit industrial development corporation that operates the airport. Land use surrounding the base is mixed. Intensive development has increased to the south and west of the base, with industrial and low-to-medium density residential uses to the north and east. Rural open space and agricultural areas dominate the landscape northeast of the base.

3.4.7.1 Base

Westover ARB is almost entirely classified as public/quasi-public land use (Westover 2014c). Several parts of the base, predominantly the northern edge adjacent to Granby, are classified as open/agricultural/low-density and wetland. The primary functional land use on the installation is categorized as airfield. The main cantonment is north of the primary runway, Runway 05/23. As with most AFRC installations, limited commercial and community functions exist on base. The Westover ARB IDP divides the base into planning districts based on geographical features, land-use patterns, building types, transportation networks, and mission and/or functional uses. The planning districts identified at Westover ARB include the Airfield District, Community District,

Flightline District, Historic Core District, Joint Use District, Mission Support District, and a Training Area District (Westover ARB 2014c).

3.4.7.2 Surrounding Areas

Intensive development has increased to the south and west of Westover ARB, and industrial and low- to medium-density residential development occupies the north and east (see Figure 3-12). Residential, industrial, and open/agricultural/low-density are the dominant land uses closest to the base in the City of Chicopee. The open/agricultural uses to the south contain forest and wetland. The Chicopee Reservoir and the Chicopee Country Club golf course are part of Chicopee Memorial State Park, which abuts the base to the south and east. Land use just west of the base, near the southern end of Runway 05/23, is classified as industrial and includes the Westover Industrial Airpark (Westover ARB 2014c).

In 2004, the Westover ARB/Westover Metropolitan Airport JLUS Update was published (Westover ARB 2004b). The 2004 JLUS report updated the original Westover JLUS prepared in 1995 and included noise exposure contours prepared for an existing (2002) condition and forecast future (2007) condition. One of the main goals of the 2004 JLUS Update was to encourage the communities surrounding Westover ARB to develop and adopt zoning overlay districts to prohibit future development in the CZs and limit the types of development within the APZs, or areas identified as greater than 65 dB $L_{A_{dn}}$ noise zones. However, only the Town of Ludlow has implemented an Aircraft Flight Overlay Zoning District.

The current AICUZ study for Westover ARB was completed in 2013 and is an update to the previous study completed in 1996 (USAF 2013a). The estimated off-base area affected by noise levels of 65 dB $L_{A_{dn}}$ or greater is 464 acres (see Section 3.4.1). The majority of this acreage is associated with open/agricultural/low-density, recreational, and public/semi-public land uses. Approximately 25 acres in the residential land use category are also affected within the 65-69 dB $L_{A_{dn}}$.

3.4.8 Infrastructure

3.4.8.1 Potable Water System

The City of Chicopee provides potable water to Westover ARB via a 16-inch water main pipeline. A 500,000-gallon elevated storage tank is used to maintain pressure and flow in the event of fire-fighting activities. In addition to the main pipeline, an emergency water supply is available via an 8-inch line (Westover ARB 2014c). The average daily water use between 2010 and 2014 was 0.13 MGD. Peak water use occurs at Westover ARB during the summer months; in July 2012 water usage peaked at 0.27 MGD. Additional potable water supply is available from the City of Chicopee (Westover ARB 2015f).

3.4.8.2 Wastewater

The City of Chicopee owns the sanitary sewer lines on base except for those within 5 feet of base facilities; the base owns the lines from the 5-foot line to the buildings. The entire system is gravity fed, connecting to the City of Chicopee system via an 18-inch main pipeline (Westover ARB 2014c). The City of Chicopee's system has a total capacity of 15.5 MGD (Moriarty 2015b). The average daily wastewater discharge from 2010 to 2014 was 0.12 MGD, or 1 percent of the wastewater treatment system capacity. The reported peak wastewater discharge was 0.27 MGD in July 2012, or 2 percent of the wastewater treatment system capacity. Additional wastewater capacity is available from the City of Chicopee (Westover ARB 2015f).

3.4.8.3 *Stormwater System*

The storm drainage system at Westover ARB was overhauled in 2012. The system provides adequate drainage to sustain surface water runoff and prevent flooding.

3.4.8.4 *Electrical System*

Chicopee Electric Lighting supplies electricity to the base. The electrical distribution system is privatized and has capacity to meet existing and future energy needs (Westover ARB 2014c). Average electric demand from 2010 to 2014 was 2.3 MWh per day, with peak demand of 2.79 MWh per day occurring during December 2010 (Westover ARB 2015i).

3.4.8.5 *Natural Gas System*

Columbia Gas of Massachusetts provides natural gas to the Westover ARB natural gas distribution system. The distribution system was replaced in 1991 and provides reliable gas service to all facilities on base. All heated facilities have been converted to individual heating systems, allowing the base to take advantage of the most economical and efficient method of heating (Westover ARB 2014c). In 2014, Westover ARB used 128 MMcf of natural gas (Westover ARB 2015i).

3.4.8.6 *Solid Waste Management*

MSW and recycling materials are collected and transported off of the installation by a combined refuse and recycling contract. In 2013, Westover ARB produced 883.3 tons of nonhazardous MSW and 52.54 tons of hazardous waste. In 2013, the diversion rate for nonhazardous MSW at Westover ARB was 62.3 percent (Westover ARB 2014c). Wastes disposed of at Westover ARB consist only of materials that cannot be recycled. C&D debris is prohibited from Massachusetts landfills. The Integrated Solid Waste Management Plan (Westover ARB 2015d) provides the details of recycling or disposal methods for all wastes generated at Westover ARB. MSW from Westover ARB is transported to the F&G Transfer Station near East Windsor, Connecticut, where the materials are sorted for further transfer to recycling centers or landfills located outside of the state. C&D waste and non-recurring MSW generated during construction or demolition activities are the responsibility of the construction contractor (Westover ARB 2015d).

3.4.8.7 *Transportation*

Primary access to Westover ARB is provided by Memorial Drive, which is a two-lane highway that extends along the western border of the base in a north-south direction. Figure 2-14 displays the regional transportation network in the vicinity of Westover ARB. I-90, also known as the Massachusetts Turnpike, is a toll highway located south of Westover ARB. The Massachusetts Turnpike extends east-west across the state of Massachusetts.

3.4.8.7.1 *Gate Access*

The two primary gates at Westover ARB are the James Street Gate and the Industrial Drive Gate. The Industrial Drive Gate provides a truck inspection point and a visitor center. Truck traffic entering the Industrial Drive Gate has quick access to the supply building and industrial areas of the base (Westover ARB 2014c).

3.4.8.7.2 On-Base Traffic Circulation

The transportation system on Westover ARB is an integrated system of roadways and pedestrian pathways. In addition to Ellipse Drive, the primary roadway is Patriot Avenue (Westover ARB 2014c).

3.4.9 Hazardous Materials and Waste

3.4.9.1 Hazardous Materials

Hazardous materials used by USAF and contractor personnel at Westover ARB are managed in accordance with the *Hazardous Materials Emergency Planning and Response (HAZMAT) Plan for Westover Air Reserve Base* and are controlled by the HAZMART (Westover ARB 2011). The HAZMART provides a centralized point through which most hazardous materials are delivered to Westover ARB. Upon receipt, hazardous materials are bar-coded prior to distribution for tracking and inventory purposes. Empty bar-coded hazardous material containers are returned to the HAZMART for tracking purposes.

3.4.9.1.1 Aboveground and Underground Storage Tanks

Bulk Jet-A fuel is stored in two ASTs at the Bulk Fuels AST Farm. There are 12 USTs associated with the Jet-A hydrant system and one (1) UST containing Jet-A at the AGE refueling area, building 7045 (Westover ARB 2011). The bulk Jet-A storage capacity at Westover ARB is approximately 2,277,000 gallons. The estimated annual Jet-A fuel consumption is approximately 5,250,000 gallons (Gale 2015).

There are various other ASTs and active and regulated USTs on Westover ARB that store gasoline, diesel fuel, fuel oil, glycol, aqueous film forming foam, hydraulic oil, potassium acetate, propane, and reclaimed Jet-A fuel (Westover ARB 2011). The *Hazardous Materials Emergency Planning and Response (HAZMAT) Plan for Westover Air Reserve Base* addresses on-base storage locations and the proper handling procedures for petroleum, oils, and lubricants (including Jet-A used by the aircraft) to minimize and respond to potential spills and releases (Westover ARB 2011).

3.4.9.1.2 Toxic Substances

The Asbestos Management Plan (Westover ARB 2013a) implements AFI 32-1052 policies and establishes procedures for accomplishing asbestos-related activities. An asbestos database is maintained by the CE squadron. The design of building alteration projects and requests for self-help projects are reviewed to determine if ACM is present in the proposed work area. For each project on base, ACM wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill.

The LBP Management Plan (Westover ARB 2013b) provides guidance and establishes procedures for the management of LBP. As with ACM, the CE squadron maintains an LBP database to document the location of LBP on Westover ARB. The design of building alteration projects and requests for self-help projects are reviewed to determine if lead-containing materials are present in the proposed work area. For every project on Westover ARB, LBP wastes are removed by the contractor and disposed of in accordance with state and Federal regulations at a permitted off-base landfill. Electrical transformers at Westover ARB reportedly do not contain PCBs (Moriarty 2015a).

3.4.9.2 Hazardous Waste Management

Westover ARB is classified as an LQG. Typical hazardous wastes generated during maintenance and operations activities include solvents, contaminated fuels and oils, paint/coatings, stripping chemicals, toxic metals, waste paint-related materials, universal wastes, and other miscellaneous wastes (USAF 2015f).

Hazardous wastes at Westover ARB are managed in accordance with the *U.S. Air Force Hazardous Waste Management Plan, Westover Air Force Base* (USAF 2015f). This plan provides guidance, policies, and procedures associated with implementing a hazardous waste management program as required by Federal and state laws and regulations. In 2015, the base generated approximately 18,900 pounds of Federally regulated (28,000 pounds of state-regulated) hazardous waste, which was disposed of at permitted off-base disposal facilities.

3.4.9.3 Environmental Restoration Program

The ERP at Westover ARB started in 1982 with a Phase I Records Search that identified 21 ERP sites, two areas of concern, and two compliance restoration sites. Eighteen (18) sites have been closed with concurrence from the Mass DEP (Westover ARB 2015g). The sites include landfills, fire training areas, fuel spills, fuel pipelines, and an industrial waste treatment plant. Petroleum is the primary contaminant in soil and groundwater. Westover ARB is not listed on the USEPA's National Priorities List. The ERP at Westover ARB is currently managed by Air Force Civil Engineer Center (AFCEC) in accordance with the Management Action Plan (Westover ARB 2015g). The Management Action Plan describes the history of the ERP and technical and strategic issues.

3.4.10 Socioeconomics

Socioeconomics refers to features or characteristics of the social and economic environment. The main concern for socioeconomic resources is the change in personnel, C&D of facilities, and renovations and modifications to existing facilities at Westover ARB as they relate to the population, employment, earnings, housing, education, and public services. The ROI for this analysis is Hampden County and Hampshire County, Massachusetts.

3.4.10.1 Baseline Conditions

3.4.10.1.1 Population

The total population in the two-county ROI has increased since 2010 at an average annual rate of 0.2 percent, with a total increase of approximately 5,205 persons over the 4-year period from 2010 to 2014 (USCB 2010; 2014a) (see Table 3-44). Hampden and Hampshire Counties and their largest population centers (Springfield and the Town of Amherst, respectively) have all experienced population increases during this 4-year period (Table 3-46) (USCB 2010; 2014a).

Table 3-44. Population in the ROI for Westover ARB

Location	2010	2014	Annual Percent Change (2010–2014)
Amherst town	37,819	39,260	0.9%
Springfield	153,060	153,836	0.1%
Hampden County	463,490	466,447	0.2%
Hampshire County	158,080	160,328	0.4%
Total (ROI)	621,570	626,775	0.2%

Source: USCB 2010; 2014a

The total number of base employees at Westover ARB in 2015 was 3,345 (Westover ARB 2015c). As shown in Table 2-15, there are 2,654 personnel on Westover ARB. This includes 66 military, 333 DoD civilians, 416 dual status technicians, 231 contractors, and 2,024 part-time Reservists. In addition, there are an estimated 1,324 military dependents and family members associated with the full-time military and civilian personnel associated with the 439 AW. Only full-time personnel were considered for this analysis, thus the 2,024 part-time Reservists were not considered part of the work force for this analysis.

3.4.10.1.2 Economic Activity (Employment and Earnings)

In 2014, employment totaled 256,383 jobs in Hampden County and 89,751 jobs in Hampshire County (BEA 2015a). The largest employment sector in Hampden County was healthcare and social assistance (19.8 percent), followed by government and government enterprises (14.0 percent), and retail trade (10.4 percent) (BEA 2015a). The largest employment sector in Hampshire County was government and government enterprises (20.8 percent), followed by healthcare and social assistance (12.1 percent), and education (11.3 percent) (BEA 2015a). Construction accounted for 4.7 percent of total employment in Hampden County and 4.1 percent of total employment in Hampshire County. The 2014 unemployment rate reported by the BLS was 7.8 percent in Hampden County, 5.0 percent in Hampshire County, and 5.9 percent in the State of Massachusetts (BLS 2016a, 2016b). Per capita, personal income in Hampden County and Hampshire County is estimated at \$43,407 and \$42,490, respectively (BEA 2015b).

Westover ARB is an important contributor to the local economy through employment of military and civilian personnel, and through expenditures for goods and services. Westover ARB has an annual payroll of \$124 million. The estimated value of indirect jobs totaled \$46.2 million in 2015, and the base experienced a net increase of \$6 million in construction and related expenditures from the previous year. The total economic impact of the base on the surrounding communities in 2015 was \$221 million (Westover ARB 2015c).

3.4.10.1.3 Housing

Table 3-45 presents census-derived housing data for Hampden County and Hampshire County. Hampden County had 191,992 total housing units in 2014, of which 7.4 percent (14,256 units) were vacant (USCB 2014b). Hampshire County had 62,767 total housing units in 2014, of which 6.4 percent (3,991 units) were vacant (USCB 2014b). The median value of owner-occupied housing units is estimated at \$196,600 in Hampden County and \$261,700 in Hampshire County. The median gross monthly rent for occupied units paying rent was \$807 in Hampden County and \$946 in Hampshire County (USCB 2014b).

Table 3-45. Housing Data in the ROI for Westover ARB, 2014

Location	Housing Units	Occupied	Vacant
Hampden County	191,992	177,736	14,256
Hampshire County	62,767	58,776	3,991
Total (ROI)	254,759	236,512	18,247

Source: USCB 2014b

There are no dormitories or on-base housing currently located on Westover ARB (USAF 2015d). No TLFs are located on Westover ARB or authorized on AFRC bases. The Westover ARB, lodging operation currently has 423 VQ rooms. Off-base hotels are utilized to accommodate personnel when VQ space is not available, as well as for families making a PCS move (USAF 2015d).

3.4.10.1.4 Education

There are 24 public school districts throughout Hampden and Hampshire Counties. These districts had a total enrollment of approximately 81,853 students in grades K-12 during the 2015 to 2016 school year (MADESE 2016). The Springfield Public School District in Hampden County has a total enrollment of 25,479 students and a student-to-teacher ratio of 12.9:1, which is less than the state average of 13.3:1. The Amherst Public School District in Hampshire County has a total enrollment of 1,182 students and a student-to-teacher ratio of 10.7:1 (MADESE 2016). No schools, childcare, or youth programs are currently operated or provided by Westover ARB.

3.4.10.1.5 Public Services

Public services in Hampden and Hampshire Counties include law enforcement, fire protection, EMS, and medical services. Law enforcement in Hampden County includes the Hampden County Sheriff's Department and the Hampden Town Police Department, while the Hampshire County Sheriff's Office is responsible for coordinating law enforcement activities within Hampshire County. The Hampden County Fire Department is a volunteer fire department serving a 20-mile radius within Hampden Town. The Amherst Fire Department and the Belchertown Fire Department serve Hampshire County. There are several hospitals located in Hampden County, including Noble Hospital (located approximately 12.8 miles from Westover ARB) and Shriners Hospital for Children (located approximately 8.4 miles from Westover ARB). Cooley Dickinson Hospital (located approximately 11.4 miles from Westover ARB) is the main hospital serving Hampshire County.

3.4.10.1.6 Base Services

The 439 AMDS has the capability to fully support the IMR and PHA for Wing population (USAF 2015e). Other base services include a fitness center and MWR activities, including outdoor recreation and a bowling center. The 27,259 square foot fitness center has been renovated within the past 10 years and is currently staffed by five FTE civilian positions. The hours of operation are 6:00 A.M. to 8:00 P.M. Mondays thru Fridays, 5:30 A.M. to 6:00 P.M. on Saturday, 5:30 A.M. to 4:00 P.M. on Sunday, and closed on non-UTA weekends and holidays. There is no military DFAC located on Westover ARB. Several on-base food options are available during the week, including the Services Consolidated Club, Services Bowling Center Grill, Services Grinders Coffee & Snack Bar, and the Exchange Shopette (USAF 2015e).

3.4.11 Environmental Justice and other Sensitive Receptors

Environmental justice analysis focuses on the off-base minority, low-income, youth (under 18), and elderly (65 and over) populations in the "affected area" or ROI. The ROI for this analysis includes the geographical areas exposed to average noise levels of 65 dB $L_{A_{dn}}$ or greater resulting from a proposed action that are not currently exposed to those noise levels under the baseline conditions (i.e., the net change). The baseline area was mapped using the noise levels described in Section 3.1. Volume II, Appendix B, Section B.2.3, provides a description of the method applied to calculate the population in the baseline area.

Table 3-46 provides baseline demographic conditions in Hampden and Hampshire Counties, where Westover ARB is located. The minority population in Hampden and Hampshire Counties ("Two Counties Combined") is comparatively greater than the state percentage, but less than the national percentage. Low-income persons compose a greater proportion of the two-county area population than the state and national populations (Table 3-46 and Figure 3-12).

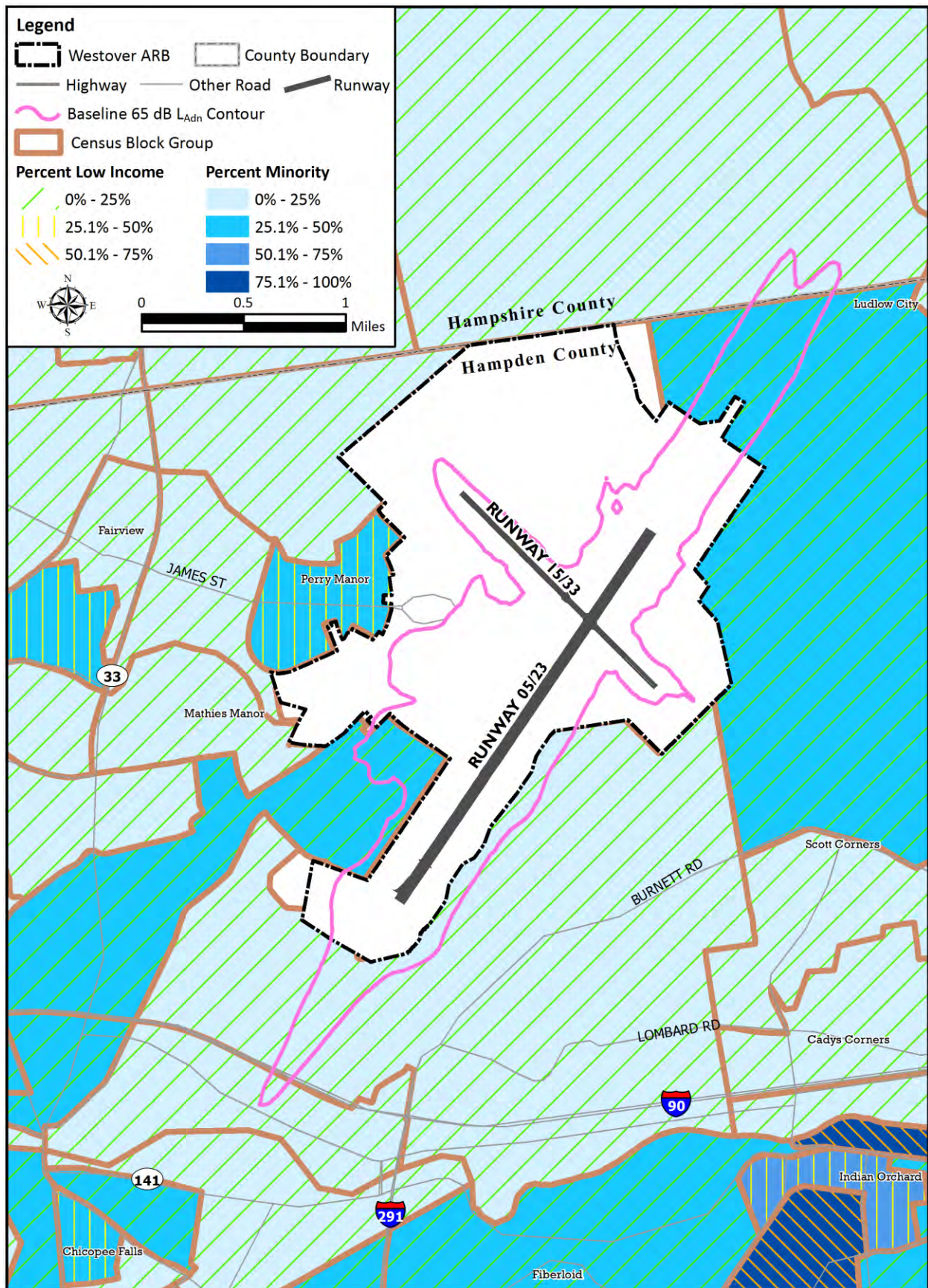


Figure 3-12. Minority and Low-Income Populations Near Westover ARB

Table 3-46. Minority and Low-Income Populations Near Westover ARB

Geographic Unit	Total Population	Minority		Low-Income	
		Number	Percent	Number	Percent
United States	314,107,084	116,947,592	37.2%	49,000,705	15.6%
State of Massachusetts	6,657,291	1,664,647	25.0%	772,246	11.6%
Hampden County	466,447	158,244	33.9%	82,561	17.7%
Hampshire County	160,328	23,566	14.7%	22,286	13.9%
Two Counties Combined	626,775	181,810	29.0%	104,671	16.7%

Source: USCB 2014a; 2014c

Under baseline conditions, off-base residential areas within the 65 dB L_{Adn} or greater extend into 3 census block groups. There is an estimated population of 38 people within this area. Of those, 5.3 percent (2 persons) are minority and 7.9 percent (3 persons) are low-income. Table 3-47 presents low-income populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-48 presents minority populations which currently experience annual average noise levels of 65 dB L_{Adn} or greater. Table 3-49 presents the youth and elderly population data comparable to that provided for the low-income and minority populations.

Table 3-47. Low-Income Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Low-Income	
	Number	Percent
250138104141	0	0.0%
250138106011	0	0.0%
250158209004	3	13.0%
Total	3	7.9%

Table 3-48. Minority Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Minority	
	Number	Percent
250138104141	0	0.0%
250138106011	1	7.1%
250158209004	1	4.3%
Total	2	5.3%

Table 3-49. Youth and Elderly Populations in the 65 dB L_{Adn} or Greater Baseline Noise Levels Near Westover ARB

Census Block Group (GEOID)	Youth	Elderly
	Number	Number
250138104141	0	0
250138106011	4	2
250158209004	6	4
Total	10	6

Key: Youth = under 18; Elderly = 65 and over.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES



4.0 ENVIRONMENTAL CONSEQUENCES

This chapter presents the analysis of the potential environmental consequences from the proposed beddown of KC-46A aircraft in support of the Third Main Operating Base (MOB 3) mission at four different active-duty U.S. Air Force (USAF) installations. As in Chapter 3, the expected geographic scope of the potential environmental consequences is identified as the region of influence (ROI). This chapter considers both direct and indirect effects of implementation of the action alternatives. Resource definitions, as well as the regulatory setting and methodology of analysis, are contained in Volume II, Appendix B. Baseline conditions (refer to Chapter 3) of each relevant environmental resource area are described to provide the public and agency reviewers a meaningful point from which they can compare future potential environmental, social, and economic effects. The No Action Alternative is also evaluated. Under the No Action Alternative there would be no change in based aircraft at Grissom Air Reserve Base (ARB), Seymour Johnson Air Force Base (AFB), or Tinker AFB. At Westover ARB, the C-5 mission would continue; however, the model of C-5 aircraft would change. As part of a previously scheduled program that is not connected to the proposed KC-46A MOB 3 beddown process, all Westover ARB-based C-5B aircraft are being replaced with C-5M aircraft. Cumulative effects are described in Chapter 5.

4.1 GRISSOM AIR RESERVE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Grissom ARB. Section 2.5.1.2 describes the facilities and infrastructure, personnel, and flight operations requirements of the proposed KC-46A MOB 3 mission and the specific actions at Grissom ARB that would be required to implement the mission. As described in Section 4.5, the No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented at Grissom ARB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Grissom ARB would continue as described for baseline conditions. The 434th Air Refueling Wing (ARW) would continue to fly their aerial refueling missions with a Primary Aerospace Vehicles Authorized (PAA) of 16 KC-135 aircraft and the personnel described under baseline conditions.

4.1.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would result from implementation of the proposed KC-46A MOB 3 mission. Contours of A-weighted day-night average sound level ($L_{A_{dn}}$) resulting from the proposed MOB 3 mission at Grissom ARB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by the Air Force Civil Engineer Center (AFCEC). Additional details of the methodologies used to calculate noise levels and assess noise impacts are contained in Volume II, Appendix B, Section B.1.3.

The proposed KC-46A MOB 3 mission at Grissom ARB would replace the existing KC-135 aircraft. There would be no change in the operations of the other aircraft operating at Grissom ARB or the collocated Grissom Aeroplex. KC-46A aircraft are 9 decibels (dB) quieter than KC-135 aircraft during approach and roughly equal in loudness during departure at a distance of 1,000 feet (Table 4-1). Several military transient aircraft that visit Grissom ARB are

louder than both the KC-46A and KC-135. Civilian aircraft, which consist primarily of propeller-driven and small jet aircraft, are generally quieter than the KC-46A and KC-135.

Table 4-1. Aircraft Noise Level Comparison at Grissom ARB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L_{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
C-5B	85% NF	104	94	78	65
C-17	1.08 EPR	85	76	64	55
Business jet (Cessna 500)	305 LBS	64	56	46	37
Dual propeller (Cessna 441)	30% RPM	70	62	52	44
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
C-5B	4.68 EPR	104	94	79	68
C-17	1.35 EPR	91	83	72	64
Business jet (Cessna 500)	1,554 LBS	76	69	58	49
Dual propeller (Cessna 441)	100% RPM	73	67	58	51
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: 434 ARW KC-135s are R models, which are quieter than older models.

Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; EPR = engine pressure ratio; LBS = pounds of thrust; RPM = revolutions per minute.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (°F) and 70 percent relative humidity.

KC-46A aircrews would use the same flying procedures (e.g., ground tracks, altitude profiles) currently used by KC-135 aircrews. Tactical flight procedure practice, which could include steep descents and spiraling departures, is primarily accomplished in flight simulators by both KC-135 and KC-46A aircrews. KC-135 aircrews very rarely fly tactical operations in the aircraft, but it is estimated that approximately 3 percent of KC-46A aircraft flying operations would be tactical.

KC-46A aircrews would fly 17 percent fewer annual airfield operations than are flown by KC-135 aircrews under baseline conditions. Implementation of the proposed MOB 3 mission would result in a 9 percent net reduction in the number of airfield operations flown by all aircraft. Training sorties for MOB 3 aircrews would mirror current flying operations. Under normal circumstances, aircrews would fly during weekdays and on non-holiday weekends. Flying during acoustic night (10:00 P.M. to 7:00 A.M.) would comprise 5 percent of total KC-46A flying operations. This would be a decrease from the 19 percent of total KC-135 operations currently flown during acoustic night. Noise generated between 10:00 P.M. and 7:00 A.M. has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

Areas that would be exposed to elevated noise levels with implementation of the proposed MOB 3 mission are compared to baseline conditions on Figure 4-1. Details of the methods used to calculate noise levels and the population affected by elevated noise are contained in Volume II, Appendix B, Section B.1.3.

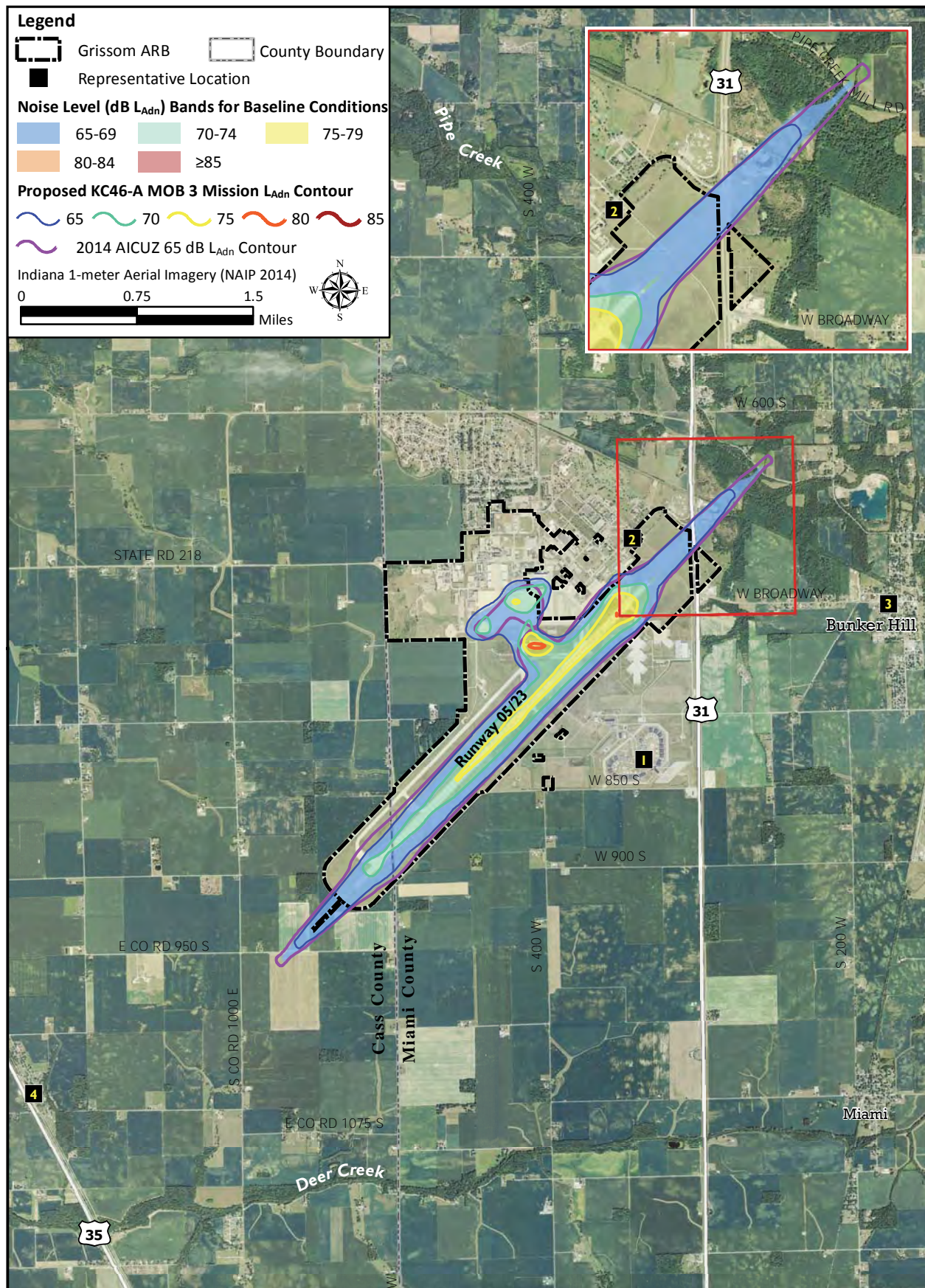


Figure 4-1. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Grissom ARB

Implementation of the proposed MOB 3 mission would decrease the number of off-base acres affected by noise levels greater than 65 dB $L_{A_{dn}}$ by 23 percent, from 90 to 69 (see Table 4-2). The off-base area affected by noise levels greater than 65 dB $L_{A_{dn}}$ would be primarily open space and would not include any residences. A commercial development located directly across U.S. Highway 31 (U.S. 31) from the base is exposed to noise levels between 65 and 70 dB $L_{A_{dn}}$ under baseline conditions and would continue to be exposed to the same range of noise levels with implementation of the proposed MOB 3 mission. Commercial developments are compatible at 65-70 dB $L_{A_{dn}}$ according to USAF land use guidelines. No off-base residents would be exposed to noise levels greater than 65 dB $L_{A_{dn}}$. The number of on-base acres affected by noise levels greater than 65 dB $L_{A_{dn}}$ would increase by 5 acres (a 1 percent increase). On-base areas that would be newly exposed to noise levels greater than 65 dB $L_{A_{dn}}$ are along the flightline and are not generally considered noise-sensitive.

Table 4-2. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Grissom ARB

Noise Level (dB $L_{A_{dn}}$)	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	320	86	406	309	65	374	-11	-21	-32
70 - 74	204	4	208	203	4	207	-1	0	-1
75 - 79	67	0	67	82	0	82	+15	0	+15
80 - 84	0	0	0	2	0	2	+2	0	+2
≥ 85	0	0	0	0	0	0	0	0	0
Total	591	90	681	596	69	665	+5 (+1%)	-21 (-23%)	-16 (-2%)

Note: “+” indicates an increase and “-” indicates a decrease.

People exposed to 80 dB $L_{A_{dn}}$ over a very long period, with no barriers to the noise (i.e., consistently outdoors), are at an increased risk of noise-induced permanent threshold shift (NIPTS), commonly referred to as hearing loss (USD 2009). No off-base areas would be affected by 80 dB $L_{A_{dn}}$ noise levels with implementation of the proposed MOB 3 mission. The only on-base areas that would be exposed to noise levels greater than 80 dB $L_{A_{dn}}$ are on or adjacent to airfield surfaces, and no structures on-base would be affected by this level of noise. Hearing loss risk among people working in high-noise environments on Grissom ARB would continue to be assessed and managed in accordance with U.S. Department of Defense (DoD), Occupational Safety and Health Administration (OSHA), and National Institute for Occupational Safety and Health (NIOSH) regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Grissom ARB are presented in Table 4-3 for baseline conditions and the proposed MOB 3 mission. Noise levels at the locations studied would remain the same or decrease slightly with implementation of the proposed MOB 3 mission.

Table 4-3. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Grissom ARB

Location ID	Location Description	Aircraft Noise Level (dB L _{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Miami Correctional Facility	Less than 45 ^a	Less than 45 ^a	No change
2	Dental Office	57	57	No change
3	First Baptist Church	Less than 45 ^a	Less than 45 ^a	No change
4	Town of Lincoln	61	60	-1

^a Forty-five (45) dB L_{Adn} is a typical ambient noise level experienced in small towns (USEPA 1974). Aircraft noise levels below ambient noise levels do not contribute substantially to overall noise levels and are listed as 'less than 45.'

Note: "+" indicates an increase and "-" indicates a decrease.

Construction and demolition (C&D) activities in support of the proposed MOB 3 mission would be conducted in the context of an active Air Force Reserve Command (AFRC) base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of equipment mufflers and would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people living or working on-base near the construction sites may notice and be annoyed by the noise. However, noise impacts would not be substantial enough to be considered significant.

The noise impacts of the proposed MOB 3 mission would be minimal and would not be perceived as significant. No mitigation measures are proposed at this time.

4.1.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Grissom ARB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.1.1, of this Draft Environmental Impact Statement (EIS) includes estimations of criteria pollutant emissions, hazardous air pollutants (HAPs), and greenhouse gases (GHGs) from proposed sources at Grissom ARB. GHGs are reported as carbon dioxide equivalent (CO₂e).

Air quality impacts from the proposed MOB 3 mission at Grissom ARB were reviewed for significance relative to Federal, state, and local air pollution standards and regulations. In the case of criteria pollutants for which the ROI is in attainment of the National Ambient Air Quality Standards (NAAQS), the analysis used the Prevention of Significant Deterioration (PSD) threshold for new major sources of 250 tons per year of that pollutant as an indicator of significance or non-significance of projected air quality impacts. In the case of criteria pollutants for which the ROI does not attain an NAAQS, the analysis used the pollutant threshold that requires a conformity determination for that region. This criterion is being used only to determine if an impact occurs as the area is in attainment and neither a PSD analysis nor a conformity determination is required.

If projected emissions exceeded a PSD or conformity threshold, further analysis was conducted to determine whether impacts would be significant. In such cases, if proposed emissions (1) would not be expected to contribute to an exceedance of an ambient air quality standard or (2) would conform to the approved State Implementation Plan (SIP), then impacts would not be significant.

The project region within Miami County attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these areas.

Construction – The proposed MOB 3 mission at Grissom ARB would require construction and/or renovation of airfield facilities, including training facilities, hangars, aircraft parking ramps, and maintenance facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions (as particulate matter less than or equal to 10 micrometers in diameter [PM₁₀] or particulate matter less than or equal to 2.5 micrometers in diameter [PM_{2.5}]) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions for the proposed MOB 3 mission.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the U.S. Environmental Protection Agency (USEPA) NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and Leadership in Energy and Environmental Design (LEED) Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels (Countess Environmental 2006). The standard construction practices for fugitive dust control could include the following:

1. Use water trucks to keep areas with vehicle movement damp enough to minimize the generation of fugitive dust.
2. Minimize the amount of disturbed ground area at a given time.
3. Suspend all soil disturbance activities when winds exceed 25 miles per hour (mph) or when visible dust plumes emanate from the site, and stabilize all disturbed areas with water application.
4. Designate personnel to monitor the dust control program and to increase watering, as necessary, to minimize the generation of dust.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Grissom ARB would begin in 2017 and would be completed in 2018.

Operations – Sources associated with operation of the proposed MOB 3 mission at Grissom ARB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) aerospace ground equipment (AGE), (3) onsite government motor vehicles (GMVs) and privately owned vehicles (POVs), (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.1.1). Emissions from on-wing testing of KC-46A aircraft engines were based on a per-aircraft basis for maintenance activities proposed for the KC-46A First Main Operating Base (MOB 1) mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive

emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. Specific activity data needed to estimate emissions from the usage of AGE for the KC-46A are not available. Therefore, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Grissom ARB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from mobile fuel transfer operations and stationary and area sources were estimated by multiplying existing emissions generated at Grissom ARB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019, after the completion of all construction activities required for the proposed MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 434 ARW, which the proposed MOB 3 mission would replace, at Grissom ARB (see Table 3-5).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.1.2.1 Air Quality Consequences

Table 4-4 presents estimates of emissions that would result from the infrastructure changes (see Table 2-3) for the proposed MOB 3 mission at Grissom ARB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions resulting from the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-4. Total Construction Emissions from the Proposed MOB 3 Mission at Grissom ARB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Demolition	0.04	0.14	0.37	0.00	0.48	0.07	103
Building Construction/Renovations	0.84	4.37	6.06	0.01	5.12	1.07	1,192
Parking Ramp - Remove Existing Asphalt	0.02	0.06	0.21	0.00	0.03	0.01	35

Table 4-4. Total Construction Emissions from the Proposed MOB 3 Mission at Grissom ARB (Continued)

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO _{2e} (mt)
Parking Ramp - Pour Concrete	0.02	0.70	0.12	0.00	0.07	0.01	34
Parking Ramp - Re-Stripe	0.00	0.03	0.04	0.00	0.03	0.01	6
Total Emissions	0.92	5.29	6.78	0.01	5.74	1.16	1,370
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO_{2e}(mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-5 summarizes the annual emissions that would result from the proposed MOB 3 mission operations at Grissom ARB. These data show that the net increase in emissions due to operation of the proposed MOB 3 mission at Grissom ARB would not exceed any PSD threshold used to indicate significance or insignificance. In addition, these emission increases would amount to no more than 7 percent of any total criteria pollutant generated within Miami County in 2011 (see Table 3-4). Therefore, the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-5. Annual Operations Emissions from the Proposed MOB 3 Mission at Grissom ARB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO _{2e} (mt)
KC-46A Aircraft Operations	21.41	84.06	299.96	16.55	1.08	0.92	45,725
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.05	0.30	0.31	0.00	0.04	0.04	72
GMVs	0.03	1.29	0.16	0.00	0.03	0.01	139
POVs – On Base	0.03	1.45	0.11	0.00	0.03	0.01	146
POVs – Off Base	0.21	15.91	1.30	0.01	0.18	0.05	1,495
Point and Area Sources	0.39	0.15	0.48	0.02	0.04	0.04	NA
Total Proposed MOB 3 Mission Emissions	33.69	142.86	321.04	18.27	1.55	1.21	52,007
Existing 434 ARW Emissions	(6.60)	(109.90)	(196.02)	(17.40)	(1.19)	(1.08)	(49,567)
Proposed MOB 3 Mission Minus 434 ARW Emissions	27.09	32.96	125.02	0.86	0.36	0.13	2,510
Operational Emissions Increases Fraction of Miami County Emissions	0.01	0.004	0.07	0.02	0.0001	0.0001	0.01
PSD Threshold	250	250	250	250	250	250	N/A

Key: SO_x – sulfur oxides; CO_{2e}(mt) = carbon dioxide equivalent in metric tons; NA = not available; N/A = not applicable.

Operation of the proposed MOB 3 mission at Grissom ARB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. These sources would be mobile and intermittent in nature, and in the case of KC-46A flight operations, they would occur up to an altitude of 3,000 feet above ground level (AGL) and across several square miles that comprise the Grissom ARB airspace and adjoining aircraft flight patterns. As a result, these emissions would be adequately dispersed through a large volume of atmosphere to the point that they would not be expected to result in substantial

ground-level impacts in a localized area. Therefore, operation of the proposed MOB 3 mission would produce minimal ambient impacts of HAPs in a localized area at Grissom ARB.

4.1.2.2 *Climate Change Effects*

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-4 shows that construction for the proposed MOB 3 mission at Grissom ARB would produce a total of 1,370 metric tons of CO₂e emissions. Table 4-5 shows that operation of the proposed MOB 3 mission at Grissom ARB would result in a net increase of 2,510 metric tons per year of CO₂e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Grissom ARB, the following considers how climate change may impact proposed operations at Grissom ARB. For Grissom ARB, the projected climate change impacts of concern are increased temperatures and precipitation, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Midwest region surrounding Grissom ARB will experience warmer temperatures and an increase in precipitation, particularly heavier rainfall events. One of the main outcomes of these conditions will be increased flooding in the region, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure. Warmer temperatures also will increase heat wave intensity and frequency, increase humidity, degrade air quality, and reduce water quality, resulting in an increase in public health risks.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by Executive Orders (EOs) and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.1.3 **Safety**

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Grissom ARB with implementation of the proposed KC-46A MOB 3 mission. While the KC-46A aircraft is a new introduction to the USAF tanker fleet, this aircraft is based on the existing commercial Boeing 767 (B-767) Jetliner, which has been used in commercial service since 1982. As of April 2016, the B-767 has been in 15 mishaps worldwide (Aviation Safety Network 2016). The commercial accident rate of the B-767 is 0.43 per flight cycle (defined as per million takeoffs) (Boeing 2015). This commercial accident rate is measuring the type of accidents comparable to a USAF Class A accident. As is the case with the KC-135 (also based upon a commercial airframe, the Boeing 707), it is expected that, over time, the accident rate of the KC-46A will be similar to that of the B-767. Additionally, accident rates for military versions of commercial airframes have been historically lower for the military versions than for their commercial counterparts.

4.1.3.1 Flight Safety

Aircraft Mishaps – The addition of 12 KC-46A aircraft would result in a decrease in airfield operations and accident potential compared to those generated by the existing 16 KC-135 aircraft at Grissom ARB. KC-46A operations within the airfield would occur under similar procedures currently in use for the KC-135 mission. Current safety policies and procedures at the base ensure the lowest possible potential for aircraft mishaps. These safety policies and procedures would continue upon implementation of the proposed MOB 3 mission.

As discussed previously, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based. Using the accident rate of 0.43 per flight cycle, it is projected that the probability of a KC-46A Class A accident in the vicinity of the airfield would be less than one accident every 100 years (see Volume II, Appendix B, Section B.3.3.1). Replacement of 16 KC-135 aircraft with 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents at Grissom ARB.

Therefore, implementation of the proposed MOB 3 mission at Grissom ARB is not anticipated to result in any net increase in safety risks associated with aircraft mishaps or result in any increase in the risks of occurrence of those mishaps.

Bird/Wildlife-Aircraft Strike Hazard – Grissom ARB has an ongoing Bird/Wildlife-Aircraft Strike Hazard (BASH) program. To address bird/wildlife-aircraft strikes, the USAF has developed the Avian Hazard Advisory System to monitor bird activity and forecast bird strike risks. Using Next Generation Radar (NEXRAD) and models developed to predict bird movement, the Avian Hazard Advisory System is an online, near-real-time geographic information system (GIS) used for bird strike risk flight planning across the continental United States (CONUS) and Alaska.

Additionally, as part of an overall strategy to reduce bird/wildlife-aircraft strike risks, the USAF has developed a Bird Avoidance Model using GIS technology as a tool for analysis and correlation of bird habitat, migration, and breeding characteristics with key environmental and manmade geospatial data. The model was created to provide USAF pilots and flight schedulers/planners with a tool for making informed decisions when selecting flight routes in an effort to protect human lives, wildlife, and equipment during air operations. This information is integrated into required pilot briefings, which take place prior to any sortie.

With proposed KC-46A flight operations expected to be similar to, and fewer than, those currently conducted by KC-135 aircrews at Grissom ARB, the overall potential for bird/wildlife-aircraft strikes is not anticipated to be significantly greater than current levels. All safety actions currently in place for existing KC-135 training would continue for KC-46A training. Grissom ARB personnel have developed aggressive procedures designed to minimize the occurrence of bird/wildlife-aircraft strikes, and have documented detailed procedures to monitor and react to heightened risk of bird strikes (Grissom ARB 2010a). When bird/wildlife-aircraft strike risks increase, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed-pattern pattern work) in the airfield and airspace environments. Special briefings are provided to pilots when the potential for bird strikes is high within the airspace. KC-46A pilots would be subject to these procedures. Therefore, no significant impact would occur related to BASH issues.

4.1.3.2 Ground Safety

No aspects of the proposed KC-46A MOB 3 mission at Grissom ARB are expected to create new or unique ground safety issues not already addressed by current policies and procedures. Operations and maintenance (O&M) procedures, as they relate to ground safety, are conducted

by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed MOB 3 mission at Grissom ARB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Grissom ARB airfield safety conditions would still be similar to baseline conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

Capability for fire response is located on base and in nearby communities. The base Fire Department is party to mutual-aid support agreements with the nearby communities. These functions would continue to occur as they have under current conditions. The decrease in aircraft operations would decrease the risk of mishaps in training areas, including over the clear zones (CZs) and accident potential zones (APZs). See Volume II, Appendix B, Figure B-1, for the typical generic CZ and APZ dimensions. The base prioritizes compatible land use planning with surrounding jurisdictions to manage future incompatible development.

4.1.4 Soils and Water

4.1.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur within the Grissom ARB boundary. All of the construction, demolition and renovation identified on Figure 2-4 would occur on previously disturbed areas. As shown in Table 2-3, the total potential disturbed area for the projects associated with the proposed MOB 3 mission would be less than 5 acres (new construction). Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling. These minor, short-term changes to soils would not result in significant impacts.

4.1.4.2 Water Resources

Less than 5 acres of impervious surface would be added to the existing 517 acres of impervious surface on the installation (Grissom ARB 2014c). Although this additional impervious surface would increase sheet flow and stormwater runoff, the total impervious surface on base would increase by less than 1 percent. This increase in impervious surface would not result in significant long-term, adverse impacts to water resources on Grissom ARB.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface

waters. However, in accordance with Unified Facilities Criteria (UFC) 3-210-10, Low Impact Development (LID) (as amended, 2016) and the Energy and Independence Security Act (EISA) Section 438 (42 *United States Code [USC]* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or Federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

The Grissom ARB Storm Water Pollution Prevention Plan (SWPPP) identifies all of the outfalls on base along with both base-wide and site specific control measures. This plan also identifies control practices that would be followed for spill prevention and response, routine inspection of discharge at sites and proper training.

Prior to construction activities, Grissom ARB or the construction contractor would submit a Notice of Intent (NOI) notifying the Indiana Department of Environmental Management (IDEM) that the proposed construction would be completed in a manner consistent with the "permit conditions" established by Rule 5. Rule 5 is the General Stormwater Permit that applies to all construction activity in Indiana resulting in a disturbance of one acre or more. In addition to publication of the NOI, the public would also be notified of the projects in a local newspaper. As part of this process, a site-specific Construction Plan/SWPPP, describing measures to be implemented prior to construction, would be prepared. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

No changes to existing aircraft deicing procedures are anticipated to be necessary with implementation of the proposed KC-46A MOB 3 mission. The current deicing process and containment system is capable of accommodating the KC-46A MOB 3 mission deicing requirements (USAF 2015b).

Based on the location of the proposed activities, as depicted on Figure 2-4, no sensitive groundwater or surface water resources are located within the areas of the base proposed for the KC-46A MOB 3 mission and significant impacts to water resources would not result from implementation of the proposed MOB 3 mission.

4.1.4.3 Floodplains

Based on the results of the GIS analysis as described in Section 3.1.4.2.3 to identify the 100-year floodplain plus three feet elevation, no floodplains are near the 434 ARW ramp, where the construction, demolition and renovation is proposed to occur. Therefore, significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.5 Biological Resources

4.1.5.1 Vegetation

Activities associated with demolition, construction, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands at Grissom ARB. These improved areas are already disturbed from ongoing routine maintenance and/or landscaping activities and are of low ecological value. Semi-improved and unimproved lands would not be affected. Therefore, potential impacts to vegetation resulting from implementation of the proposed KC-46A MOB 3 mission at Grissom ARB are anticipated to be minor and short-term.

4.1.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes.

Because the improved areas proposed for development are highly disturbed, these areas provide very little habitat for wildlife species. However, some adaptable wildlife species (e.g. eastern cottontails, raccoons, and various bird species) could use these urban-type areas.

Noise resulting from the proposed construction would be localized, short-term, and only during daylight hours. The site is a military industrial land use with frequent elevated noise levels. Wildlife in the areas proposed for construction and near the airfield is already exposed to elevated noise under baseline conditions.

Although some new improved areas on base would be exposed to noise levels above 65 dB $L_{A_{dn}}$, the number of off-base acres affected by these noise levels would decrease by 21 acres. Therefore, no significant impacts to wildlife are anticipated to result from implementation of the proposed MOB 3 mission.

Aircraft operations associated with the proposed KC-46A MOB 3 mission would decrease by 17 percent. This decrease would reduce the aircraft strike potential for birds (including migratory species) and other wildlife. The BASH plan for Grissom ARB establishes procedures and actions to minimize bird/wildlife-aircraft strikes.

4.1.5.3 Special-Status Species

The upland sandpiper, a Federal species of conservation concern and an Indiana state endangered species, was identified by the U.S. Fish and Wildlife Service (USFWS) as a documented nesting species at Grissom ARB. An adult pair was observed on the ground near the perimeter fence. Additionally, six other avian species of conservation concern that use grassland and shrub habitats were identified, although the exact nesting locations were not specified. These species include the bobolink, brown thrasher, dickcissel, field sparrow, eastern meadowlark, and grasshopper sparrow. In July 2015, the northern harrier was also observed soaring at Grissom ARB, but breeding has not been confirmed at the base.

No conflicts between special-status species or other breeding birds with aircraft are currently known to occur on base (USFWS 2016a). The proposed construction, demolition and renovation would not occur in upland sandpiper nesting habitat. The Grissom ARB BASH Plan (Grissom ARB 2010a) establishes species-specific procedures and actions to minimize risks to these species of conservation concern. Continued adherence to the base's BASH Plan would minimize the risk of bird-aircraft strikes. In a letter dated 4 April 2016, the Indiana Department

of Natural Resources (IDNR) identified the American badger and the kidneyshell mussel as two state species of concern known from within 0.5 mile of Grissom ARB. As described in Section 4.1.4 standard erosion control measures would be implemented and no impacts to the kidneyshell mussel are anticipated. In addition, the IDNR noted that impacts to the badger or its habitat are unlikely to result from implementation of the proposed MOB 3 mission (IDNR 2016). Therefore, impacts to endangered species or USFWS species of special concern are not anticipated to result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.5.4 Wetlands

Because, no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed MOB 3 mission at Grissom ARB.

4.1.6 Cultural Resources

There are no National Register of Historic Places (NRHP)-listed or eligible cultural resources at Grissom ARB. Indiana State Historic Preservation Office (SHPO) concurred with the USAF determination that there are no historic properties resources within the area of potential effect (APE) for the KC-46A MOB 3 mission (see letter dated 18 April 2016, Volume II, Appendix A, Section A.5.4.2). Because ground-disturbing activities would occur in previously disturbed areas, it is extremely unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with Section 106 of the National Historic Preservation Act (NHPA).

As required by Sections 101(d)(6)(B) and 106 of the NHPA, implementing regulations at 36 *Code of Federal Regulations (CFR)* Section 800.2(c)(2), EO 13175, and Department of Defense Instruction (DoDI) 4710.02, Grissom ARB is consulting with tribes on a government-to-government basis to identify any traditional cultural properties that may be present on the base. Appendix A, Section A.3, contains a record of these consultations. The consultation correspondence includes an invitation to participate in the National Environmental Policy Act (NEPA) process, and an invitation to consult directly with the Grissom ARB base Commander regarding any comments, concerns, and suggestions (see letter dated 29 March 2016, Volume II, Appendix A, Section A.3).

Table A-1 in Volume II, Appendix A, Section A.3, contains a record of tribal consultation up to the publication of this document. No concerns regarding traditional cultural properties, properties of traditional religious or cultural importance, or other cultural concerns have been received. Grissom ARB has completed tribal consultation for the proposed KC-46A MOB 3 mission.

4.1.7 Land Use

4.1.7.1 Physical Development

The proposed C&D projects and renovations to existing facilities at Grissom ARB would all occur within the existing Flightline District and Mission Support District, which includes airfield pavement, aircraft O&M, and community service land use categories. Because the proposed C&D projects and facility modifications would not result in any changes to the existing land use categories, there would be no direct land use impacts. The physical changes and daily activities on the ground would be confined to the base. The proposed projects would have no land use impacts to off-base areas.

Physical development (i.e., construction activity) on the base could result in short-term effects (e.g., noise, dust, and traffic) on existing land use and activities. The base would require contractors to use standard construction practices to reduce construction-related effects, especially around housing and community areas, schools, and daycare facilities. Such practices could include measures to control the hours for operating equipment, use of properly maintained equipment and sound-muffling fixtures, proper siting of equipment operating and staging areas (away from sensitive locations), selection of truck and delivery routes, and speed limits for construction and worker vehicles.

4.1.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Grissom ARB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No noise-related impacts to land use would occur because implementation of the proposed KC-46A MOB 3 mission at Grissom ARB would result in a 21-acre decrease in land exposed to noise levels greater than 65 dB $L_{A_{dn}}$. These decreases occur at the northern and southern extents of the 65 dB $L_{A_{dn}}$ noise contour over forested or agricultural lands (Figure 4-1). No off-base residential property is exposed to noise levels greater than 65 dB $L_{A_{dn}}$.

No significant impacts to land uses on or off base would result from implementation of the proposed MOB 3 mission.

4.1.8 Infrastructure

Refer to Section 3.1.8 for a description of existing infrastructure system capacities and conditions at Grissom ARB. Table 2-4 provides changes in population that would result from implementation of the proposed MOB 3 mission at Grissom ARB. These projected changes in population and development were used to determine potential impacts to infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.1.8.1 Potable Water System

Based on the average usage rate of 125 gallons per day (GPD) (UFC 3-230-03) per person, it is anticipated that the change in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.07 million gallons per day (MGD) (125 GPD x 545). Use of the 125 GPD per person is a conservative measure of water use, as these numbers reflect the average residential use, which includes showering, laundry, and other non-drinking uses of water. This increase, combined with the existing water use (0.023 MGD), would not exceed Grissom's ARB current contract with Peru Utilities water system for 0.8 MGD and impacts would be less than significant.

4.1.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate, the proposed increase in population would increase wastewater discharge from Grissom ARB by

0.07 MGD (120 GPD x 545). Even under current peak flow conditions (0.2 MGD), this increase in wastewater discharge would be below the 0.3 MGD discharge limit in place with the Peru Utilities and impacts would be less than significant. As noted in Section 3.1.8.2, most of the peak flow is based on infiltration into the sewer system during precipitation events.

4.1.8.3 Stormwater System

Table 2-6 lists the projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 5 acres (the area for new construction), and impacts would be less than significant. The largest area of disturbance would be associated with the new 2-bay hangar.

During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. The SWPPP would need to be amended if a change in design, construction, operation, or maintenance would have significant effect on the potential for discharge of pollutants to the waters of the State of Indiana. During the short-term construction period for the proposed MOB 3 mission, the contractor would be required to comply with the new SWPPP and applicable statutes, standards, regulations, and procedures regarding stormwater management during construction. Additional stormwater requirements are described in Section 3.1.4.

4.1.8.4 Electrical System

The U.S. Energy Information Administration (USEIA) estimates that the average household in Indiana uses 1.09 megawatt hours (MWh) per month (USEIA 2014). Converting this rate to an hourly rate and assuming 217 new households (i.e. one new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Grissom ARB by 0.3 megawatt (MW). This increase would not exceed the Rural Electric Membership Cooperative supply limit of 11.5 MW and impacts would be less than significant.

4.1.8.5 Natural Gas System

The USEIA estimates that the average person in Indiana uses 23.7 thousand cubic feet (Mcf) of natural gas per year (USEIA 2016). This rate was converted to an hourly usage and then multiplied by the increase in population (545) to estimate that natural gas use would increase at Grissom ARB by 1.5 Mcf per hour. This increase, combined with the existing natural gas use at Grissom ARB (7.75 Mcf), would not exceed the Northern Indiana Public Service Company supply limit of 167 Mcf per hour and impacts would be less than significant.

4.1.8.6 Solid Waste Management

Using methodology developed by the USEPA (USEPA 2009b), it is estimated that implementation of the proposed MOB 3 mission would generate approximately 6,163 tons of C&D debris for recycling or removal to landfills. Application of the 60 percent DoD target diversion rate (DoD 2012) for C&D debris would result in approximately 3,698 tons being reused or recycled and approximately 2,465 tons (4,930 cubic yards) placed in the Cass County-Oakridge Landfill or other landfills in the region. The Cass County-Oakridge Landfill has more than 2,000,000 cubic yards remaining capacity and would be able to accommodate the material resulting from the proposed MOB 3 mission (IDEM 2014). Additional personnel and dependents

associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of municipal solid waste (MSW) from the base. C&D debris, including debris contaminated with hazardous waste, asbestos-containing material (ACM), lead-based paint (LBP), or other hazardous components, would be managed in accordance with Air Force Instruction (AFI) 32-7042, "Waste Management."

4.1.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Grissom ARB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities, along with construction crews, would access the base via the Main Gate or the West Gate. Construction-related traffic would comprise only a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with these activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the proposed facility and infrastructure project projects. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time and by using the South Gate instead of the Main Gate. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term or significant impacts on transportation infrastructure are anticipated.

Implementation of the proposed KC-46A MOB 3 mission at Grissom ARB would result in an increase of 217 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 24 percent increase in daily commuting traffic to and from the base. In addition to the increase in personnel, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. The increase in base mission personnel could increase congestion and queuing at the Main Gate during morning and evening rush hours. To minimize this, the base could adjust the schedule of operations to accommodate this increase, and/or provide additional personnel at the gate to process security checks during peak hours, if necessary. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.1.9 Hazardous Materials and Waste

4.1.9.1 Hazardous Materials Management

The USAF has developed a Hazardous Materials Management Plan (HMMP) for the KC-46A program. This plan details the strategy for integrating hazardous materials management into the KC-46A system. The USAF will actively pursue efforts to minimize or eliminate the use of various materials, including hexavalent chromium, cadmium, and halon. The KC-46A will be the first aircraft in the Air Mobility Command (AMC) inventory to be completely free of ozone-depleting substances (ODS), including handheld fire extinguishers. The corrosion protection program for the KC-135 uses hexavalent chromium on both the interior and exterior. After the first 11 aircraft, the KC-46A corrosion control program will only use hexavalent chromium on the interior of the aircraft. Specific alternatives to cadmium plating are currently being implemented for use on KC-46A aircraft. These include zinc-nickel plating in lieu of cadmium for plating on bearings and bushings when required. Standard materials (e.g., cleaning solvents, sealants, adhesives, and paints) may be required for routine maintenance and repairs. The preference will be to use the least hazardous material when alternates are available.

Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through Hazardous Materials Pharmacies (HAZMARTs) are adequate to handle the changes anticipated with the replacement of the KC-135 mission (16 aircraft) with the KC-46A MOB 3 mission (12 aircraft). The reduction of aircraft and operations would decrease the use and consumption of hazardous materials at Grissom ARB, resulting in beneficial environmental impacts.

4.1.9.1.1 Aboveground and Underground Storage Tanks

The proposed replacement of 16 KC-135 aircraft with 12 KC-46A aircraft and the decrease in operations at Grissom ARB would potentially decrease the maximum daily consumption of Jet-A. The new Type III system would enhance fuel delivery at the base. Some of the new and remodeled facilities would require the addition of new aboveground storage tanks (ASTs) and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to oil-water separators (OWSs), if required, to contain uncontrolled releases of petroleum products. The MOB 3 mission would require demolition of Buildings 437 and 438 to clear space for the construction of the new hangar. An AST associated with a generator for Building 437 and two ASTs (generator and aqueous film-forming film) associated with Building 438 would be removed. The *Grissom ARB Hazardous Material Emergency Planning and Response Plan* (Grissom ARB 2014b) would be amended to incorporate any changes in facility design, construction operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products to the environment.

4.1.9.1.2 Toxic Substances

Demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Grissom ARB. ACMs have been positively identified inside Buildings 209, 437, and 438. Volume II, Appendix F, Table F-1, contains a list of buildings proposed for modification with the implementation of the KC-46A MOB 3 mission and their potential to contain ACMs.

Prior to initiating demolition and renovation projects, exposed friable asbestos would be removed in accordance with applicable Federal, state, local, and USAF rules and regulations. Before initiating the ACM removal work, IDEM Office of Air Quality and USEPA notifications would be completed. Work on ACM projects would only be conducted by persons with current certificates

of training in accordance with standards established by OSHA and the USEPA. Asbestos abatement contractors must be licensed by the IDEM. All ACM wastes would be disposed of at a waste disposal site authorized to accept such waste. Additionally, the handling and disposal of ACM wastes would be performed in accordance with the *Grissom ARB Asbestos Management Plan* (Grissom ARB 2010b), and in compliance with Federal, state, and local regulations. Transport and disposal documentation records, including signed manifests, would also be required.

According to standard operating procedures, LBP surveys are conducted prior to any renovation or demolition activities. Buildings 209 and 437 are known to contain LBP. Based on years of construction, seven additional buildings proposed for renovation or demolition have the potential to contain LBP. Volume II, Appendix F, Table F-1, contains a list of buildings proposed for modification with the implementation of the MOB 3 mission at Grissom ARB and their potential to contain LBP. Demolition of structures known to contain LBP would be conducted in accordance with applicable regulations. Because no multi-family housing, target housing, or child-related facilities are located on base, notification to IDEM of lead-abatement projects is not required. Disposal of any lead-containing wastes would be conducted in accordance with Federal regulations, including the Toxic Substances Control Act (TSCA) and the Occupational Safety and Health Act. These wastes would be accompanied by a waste manifest and disposed of at an approved, off-base disposal facility.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the KC-46A MOB 3 mission at Grissom ARB. Long-term benefits from removal of toxic substances are anticipated.

4.1.9.2 Hazardous Waste Management

Grissom ARB would continue to be classified as a large-quantity generator (LQG) and generate hazardous wastes during various O&M activities. Hazardous waste disposal procedures, including off-base disposal procedures, are adequate to handle a potential decrease in quantity and thus would remain the same. Hazardous waste anticipated to be generated by the proposed KC-46A MOB 3 mission would be consistent with waste generated by the existing KC-135 mission. Waste materials associated with maintenance activities include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. Operations involving hexavalent chromium, cadmium, and halon (i.e., ODS) have been eliminated or minimized to the extent possible (Boeing 2013). Hazardous materials such as trichloroethane (TCE) have available alternates and would not be required for the KC-46A MOB 3 mission. No new hazardous materials would be added that exceed Grissom ARB's current hazardous waste processes.

The proposed replacement of 16 KC-135 aircraft with 12 KC-46A aircraft and the decrease in operations at Grissom ARB would potentially decrease the generation of hazardous waste, resulting in a positive environmental impact.

4.1.9.3 Environmental Restoration Program

Of the 14 Installation Restoration Program (IRP) sites located at Grissom ARB, 2 sites have the potential to be impacted by the C&D activities proposed for Grissom ARB. No monitoring wells would be impacted by proposed C&D activities.

The proposed MOB 3 mission would require the demolition of Buildings 437 and 438 to clear space for the new hangar construction. The proposed MOB 3 mission would also require the

renovation of Buildings 434 (Fuselage Trainer [FuT]), 436 (Alternate Mission Equipment [AME]), and 439 (Maintenance/Various Shops). These C&D activities would require the removal of four OWSs (OWS 437N, 437S, 438N and 438S) and would potentially impact an additional six (OWS 434N, 434S, 436N, 436S, 439N, and 439S). All these OWSs are included in IRP site OT-045, which consists of 22 OWSs located throughout the installation. IRP site OT-045 is closed with No Further Response Action Planned. Institutional controls at the site include restriction of access to members of the public and to base personnel, shallow groundwater consumption restrictions, and digging permit requirements. The USAF would coordinate with the AFCEC restoration office before any construction, renovation, demolition, or modification projects are initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with the current Environmental Impact Analysis Process (EIAP) as specified in AFI 32-7061.

Building 663 is near IRP site PL-758, Low Point Drain Box #2. Lead in the groundwater is the main contaminant of concern at this site. Planned renovations for Building 663 would include interior renovations only, and no subsurface disturbance would occur. Therefore no impacts to PL-758 would occur.

During C&D activities, there is the possibility that undocumented contaminated soils or groundwater may be present. If encountered, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

Grissom ARB would coordinate with the IDEM prior to any construction activities on an active IRP site. No significant impacts to IRP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near IRP sites.

4.1.10 Socioeconomics

4.1.10.1 Population

The current personnel at Grissom ARB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-4. Implementation of the proposed MOB 3 mission would potentially add up to 202 full-time mission personnel (not including contractors) and 328 military and DoD civilian dependents to the ROI, resulting in a 0.7 percent increase in the total ROI population. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population.

4.1.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-4, implementation of the proposed MOB 3 mission at Grissom ARB would increase the full-time work force assigned to Grissom ARB by 217 total personnel (including contractors). Using the Impact Analysis for Planning (IMPLAN) model, the direct effect of 217 full-time personnel at Grissom ARB would have an estimated indirect and induced effect of approximately 29 jobs. Indirect and induced jobs would be created in industries such as limited-service restaurants, nursing and community care facilities, full-service restaurants, retail, hospitals, individual and family services, personal care services, and real estate. With a 2014 unemployment

rate of 5.8 percent in Cass County and 6.8 percent in Miami County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide limited economic benefits. The USAF estimates that \$117.8 million in military construction (MILCON) expenditures would be associated with implementation of the proposed MOB 3 mission at Grissom ARB. The majority of MILCON expenditures (\$114.8 million) would occur in 2017, with an estimated \$3 million occurring in 2019. The total expenditures could generate approximately 1,197 jobs, primarily within the construction industry or related industries, including retail stores (i.e., non-store retailers, miscellaneous store, general merchandise, and gasoline stations) and wholesale trade. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 33,591 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of \$117.8 million at Grissom ARB would generate an estimated \$11.4 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.1.10.3 Housing

Although no dormitories are currently located on Grissom ARB, Building 473 (Table 2-3) would be renovated to provide housing for first-term Airmen/single Airmen. Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 202 off-base housing units. Based on the number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.1.10.4 Education

As described in Section 2.5.1.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 197 dependents would be of school age and would enter any of the eight school corporations in the ROI. The projected number of incoming students would represent a 1.4 percent increase of the current total enrollment. Based on the number of school corporations and schools in the ROI, as well as class size for the state, it is anticipated that the schools in the ROI would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.1.10.5 Public Services

Cass County and Miami County represent a large community with police, fire, and other services. Implementation of the proposed MOB 3 mission would add approximately 530 USAF-related personnel and dependents, which represents approximately a 0.7 percent increase in the total ROI population. While demand for public services in the ROI would increase with the projected change in population, it is anticipated that these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small (less than 1 percent)).

4.1.10.6 Base Services

Base services on Grissom ARB are in good condition; however, several base services would require additional manpower and facilities to accommodate the incoming personnel associated with the proposed MOB 3 mission. No forms of childcare or youth programs are currently available on Grissom ARB. However, several childcare and youth programs are available in communities located within 7 to 15 miles of Grissom ARB. It is anticipated that these childcare and youth programs would support the needs of incoming personnel. A military dining facility is located on the installation but has limited operational hours. Personnel associated with the proposed MOB 3 mission would utilize commercial dining facilities outside of Grissom ARB.

To accommodate the personnel increase that would occur with implementation of the proposed MOB 3 mission, extended operational hours for the fitness center could be required. Should operational hours be adjusted, up to two additional full time employee (FTE) positions would be required at the fitness center. The USAF identified that up to one additional FTE position would also be needed to fully support the Airmen & Family Readiness (A&FR) program. By meeting the additional manpower and facility requirements that have been identified, Grissom ARB would be able to support the personnel increase that would occur with implementation of the proposed MOB 3 mission.

4.1.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes areas that are exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.1.11 indicates that no people are currently exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater.

Aircraft-generated noise levels of 65 dB $L_{A_{dn}}$ or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise. Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

Analysis of the proposed MOB 3 mission noise contours relative to the baseline contours at Grissom ARB indicates that no people would be exposed to any additional noise levels greater than baseline levels; thus no disproportionate impacts would occur. In addition, no youth or elderly populations, on or off-base, would be exposed to increased noise levels.

4.2 SEYMOUR JOHNSON AIR FORCE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Seymour Johnson AFB. Section 2.5.2 describes the facilities and infrastructure, personnel, and flight operations requirements of the KC-46A MOB 3 mission and the specific actions at Seymour Johnson AFB that would be required to implement this mission. As described in Section 4.5, the No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented at Seymour Johnson AFB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Seymour Johnson AFB would continue as described for baseline conditions. The 916 ARW would continue to fly aerial refueling missions with a PAA of 16 KC-135 aircraft.

4.2.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would result from implementation of the proposed KC-46A MOB 3 mission. The L_{Adn} noise levels resulting from the proposed MOB 3 mission at Seymour Johnson AFB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section are contained in Volume II, Appendix B, Section B.2.1.

The proposed KC-46A MOB 3 mission at Seymour Johnson AFB would replace the entire fleet of KC-135 aircraft currently assigned to the 916 ARW with KC-46A aircraft, but the operations of other aircraft would remain unchanged. At a distance of 1,000 feet, KC-46A aircraft are 9 dB quieter than KC-135 aircraft during approach and roughly equal in loudness during departure (Table 4-6). F-15E aircraft are 18 dB louder during approach and 27 dB louder during departure than KC-46A aircraft. In an acoustic environment including both KC-46A and F-15E aircraft operations, the operations of the F-15E aircraft would be much more noticeable.

Table 4-6. Aircraft Noise Level Comparison at Seymour Johnson AFB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
F-15E	82% NC	92	85	73	63
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
F-15E	91% NC	114	105	94	84

Notes: 916 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.

4 FW F-15E aircraft depart using afterburner power; however, afterburner is de-selected soon after liftoff, and the remainder of climb-out is accomplished using power setting at or near 92% NC.

Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; NC = engine core speed.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59 degrees Fahrenheit (°F) and 70 percent relative humidity.

In general, KC-46A aircrews would use the same ground tracks and altitude profiles currently flown by KC-135 aircrews at Seymour Johnson AFB. Tactical flight procedures, including spiraling climb-out over the base and non-standard approaches to land, are almost entirely practiced in flight simulators by both KC-135 and KC-46A aircrews. KC-135 aircrews very rarely practice tactical flight operations during actual flights. KC-46A aircrews would conduct tactical procedure training in the aircraft slightly more frequently (approximately 3 percent of total operations).

KC-46A aircrews would fly 68 percent more airfield operations annually than are flown by KC-135 aircrews under baseline conditions (see Table 2-9). However, F-15E aircraft operations comprise the vast majority of total operations at Seymour Johnson AFB such that the net effect of the proposed MOB 3 mission would be a 3 percent change in the total operations flown. Similar to ongoing KC-135 operations, KC-46A operations would only occur on non-holiday weekdays under normal conditions. KC-46A aircrews would fly 5 percent of total operations during acoustic night (10:00 P.M. to 7:00 A.M.), a decrease from the 13 percent of KC-135 operations currently flown during acoustic night. Noise generated during acoustic night has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

F-15E aircraft operations are both louder and more frequent than either the ongoing operations of KC-135 aircraft or the proposed operations of KC-46A aircraft. F-15E operations are the primary factor determining the overall noise levels and extent of noise contours near Seymour Johnson AFB. Additionally, while implementation of the proposed MOB 3 mission would increase aircraft operations at Seymour Johnson AFB, KC-46A aircraft landing operations are quieter than KC-135 landing operations (see Table 4-6). The proposed replacement of the KC-135 fleet with KC-46A aircraft would have very little effect on L_{Adn} (Figure 4-2).

Implementation of the proposed KC-46A MOB 3 mission would decrease the number of on-base acres affected by noise greater than 65 dB L_{Adn} by 1 acre (<1 percent change) and increase the number of off-base acres affected by noise greater than 65 dB L_{Adn} by 1 acre (<1 percent change) (Table 4-7). The total number of acres affected by noise greater than 65 dB L_{Adn} , including both on-base and off-base area, would not change. The estimated off-base population affected by noise levels greater than 65 dB L_{Adn} would increase by 1 person (<1 percent change from 7,682 to 7,683) (Table 4-8). The methods used to calculate noise levels, and the population affected by elevated noise levels, are described in detail in Volume II, Appendix B, Section B.1.3.

Table 4-7. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB

Noise Level (dB L_{Adn})	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	572	8,324	8,896	572	8,322	8,894	0	-2	-2
70 - 74	523	4,488	5,011	523	4,489	5,012	0	+1	+1
75 - 79	551	2,117	2,668	549	2,118	2,667	-2	+1	-1
80 - 84	482	600	1,082	477	601	1,078	-5	+1	-4
≥ 85	843	140	983	849	140	989	+6	0	+6
Total	2,971	15,669	18,640	2,970	15,670	18,640	-1 (<-1%)	+1 (<+1%)	0

Note: "+" indicates an increase and "-" indicates a decrease.

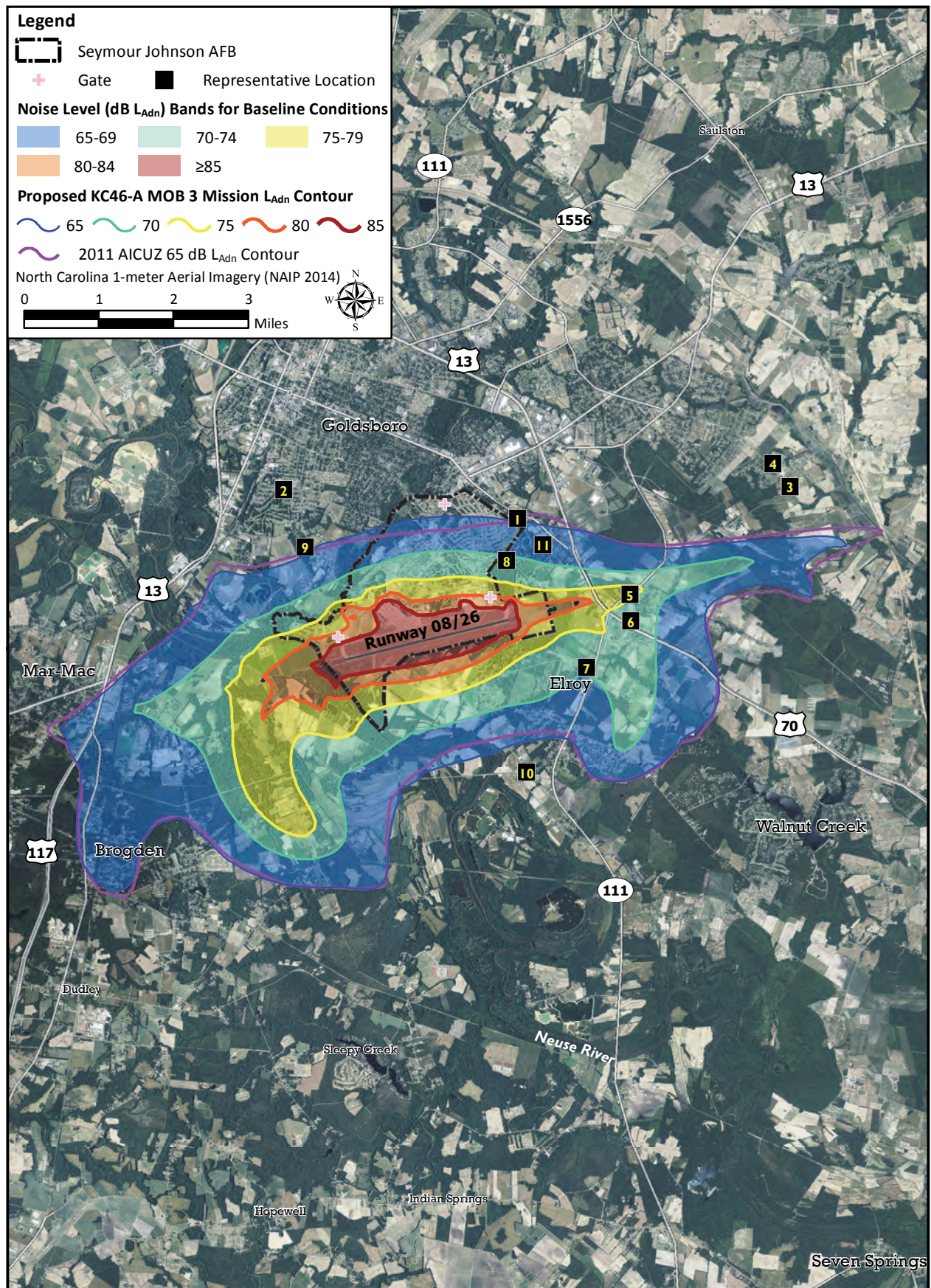


Figure 4-2. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Seymour Johnson AFB

Table 4-8. Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Seymour Johnson AFB

Noise Level (dB L _{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
65 - 69	4,686	4,686	0
70 - 74	2,330	2,330	0
75 - 79	536	537	+1
80 - 84	69	69	0
≥ 85	61	61	0
Total	7,682	7,683	+1 (<+1%)

Note: “+” indicates an increase and “-” indicates a decrease.

The estimated off-base population exposed to noise levels greater than 80 dB L_{eq24} would not change with implementation of the proposed MOB 3 mission and the same 107 on-base buildings affected by noise levels greater than 80 dB L_{eq24} under baseline conditions would be affected with implementation of the proposed MOB 3 mission (Table 4-9). Hearing loss risk among people working in high-noise environments on Seymour Johnson AFB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure. Because no new areas would be exposed to noise levels greater than 80 dB L_{eq24}, there would be no additional risk of hearing loss with implementation of the proposed MOB 3 mission. The current level of risk would remain unchanged with implementation of the proposed MOB 3 mission.

Aircraft noise levels at several representative locations surrounding Seymour Johnson AFB are presented in Table 4-10. Noise levels would change by less than 1 dB at all of the locations studied.

Table 4-9. Estimated Off-base Population Exposed to Noise Levels Greater than 80 dB L_{eq24} Resulting from Baseline Conditions and the Proposed MOB 3 Mission

Noise Level (dB L _{eq24})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
80-81	11	11	No change
81-82	33	33	No change
82-83	11	11	No change
83-84	0	0	No change
84-85	11	11	No change
85-86	11	11	No change
86-87	11	11	No change
87-88	0	0	No change
88-89	11	11	No change
89-90	10	10	No change
Total	109	109	No change

Table 4-10. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Seymour Johnson AFB

Location ID	Location Description	Aircraft Noise Level (dB L _{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Meadow Lane Elementary	65	65	0
2	Carver Heights Elementary	59	59	0
3	Eastern Wayne Elementary	56	56	0
4	Eastern Wayne High	60	60	0
5	Miller's Chapel	76	76	0
6	New Hope Friends Church	73	73	0
7	Sheridan Forest Worship Center	70	70	0
8	Atkinson Chapel Church	70	70	0
9	Bible Faith Missionary Baptist	64	64	0
10	Harvest Baptist	63	63	0
11	Korean Presbyterian Church	68	68	0

C&D in support of the proposed MOB 3 mission would be conducted in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise. However, noise impacts would not be substantial enough to be considered significant.

Practice approaches by KC-46A aircrews at Kinston Regional Jetport would result in a noise level increase that would not be perceived as significant. Kinston Regional Jetport currently supports approximately 21,000 airfield operations per year, including approximately 1,000 operations conducted by Seymour Johnson AFB-based KC-135 aircraft. With implementation of the MOB 3 mission, KC-46A aircrews would conduct approximately 1,600 airfield operations per year. KC-46A aircrews would follow the same procedures as existing KC-135 aircrews, and operations during the late-night time period between 10:00 P.M. and 7:00 A.M. would continue to be rare. Approximately 9,000 of the operations ongoing under baseline conditions are conducted by fighter aircraft or large military jet aircraft, which are assumed to be as loud as or louder than the KC-46A. Potential noise level changes associated with 600 additional KC-46A operations in this context were estimated at 0.3 dB L_{Adn} or less using formulae described in Volume II, Appendix B, Section B.1.3. This change in dB L_{Adn} is minimal and would not be expected to be perceived as significant.

Noise impacts under the proposed MOB 3 mission at Seymour Johnson AFB (aircraft and C&D noise) would be minimal and would not be expected to be perceived as significant. No mitigation measures are proposed at this time.

4.2.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.2.1, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Seymour Johnson AFB.

The immediate area surrounding Seymour Johnson AFB within Wayne County currently attains all of the NAAQS. The area of Kinston Regional Jetport within Lenoir County, which is proposed for use as an auxiliary airfield for KC-46A aircraft operations, also attains all NAAQS. Therefore, the analysis separately applied the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts to each of these areas. This criterion is being used only to determine if an impact occurs, as the area is in attainment and a PSD analysis is not required.

Construction – The proposed MOB 3 mission at Seymour Johnson AFB would require construction and/or renovation of airfield facilities, including training facilities, hangars, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM₁₀/PM_{2.5}) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Seymour Johnson AFB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes the standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Seymour Johnson AFB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.2.1). Emissions from on-wing testing of KC-46A aircraft engines were based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).

2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Seymour Johnson AFB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from mobile fuel transfer operations and stationary and area sources were estimated by multiplying existing emissions generated at Seymour Johnson AFB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019 after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 916 ARW, which the MOB 3 mission would replace at Seymour Johnson AFB (see Table 3-15).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.2.2.1 Air Quality Consequences

Table 4-11 presents estimates of emissions from the infrastructure changes (see Table 2-7) for the MOB 3 mission at Seymour Johnson AFB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in 1 year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-11. Total Construction Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Demolition	0.05	0.17	0.46	0.00	0.61	0.09	131
Building Construction	0.88	4.61	6.39	0.01	5.40	1.12	1,258
Building 4822 Renovation	0.00	0.00	0.01	0.00	0.00	0.00	2
Total Emissions	0.93	4.78	6.86	0.01	6.01	1.21	1,391
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO₂e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-12 summarizes the annual operational emissions within Wayne County that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The data in Table 4-12 show that the net increase in emissions from the replacement of existing KC-135 aircraft operations with operations from 12 KC-46A aircraft would not exceed any PSD threshold. In addition, these emission increases would amount to no more than 2 percent of any total criteria pollutant generated within Wayne County in 2011 (see Table 3-14). Therefore, implementing the proposed MOB 3 mission at Seymour Johnson AFB would not result in significant impacts.

Table 4-12. Annual Operations Emissions from the Proposed MOB 3 Mission at Seymour Johnson AFB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC-46A Aircraft Operations	21.58	78.63	142.91	8.81	0.62	0.54	24,149
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE – KC-46A	0.04	0.21	0.22	0.00	0.03	0.03	51
GMVs	0.26	7.43	2.57	0.01	0.33	0.12	1,423
POVs – On Base	0.08	5.12	0.32	0.00	0.10	0.02	513
POVs – Off Base	0.10	8.78	0.61	0.01	0.09	0.02	810
Point and Area Sources	3.31	0.09	0.20	0.01	0.14	0.11	NA
Total Proposed MOB 3 Mission Emissions	36.92	139.97	165.56	10.53	1.47	0.98	31,446
Existing 916 ARW Emissions	(6.36)	(77.13)	(50.16)	(5.06)	(0.64)	(0.46)	(15,572)
Proposed MOB 3 Mission Minus 916 ARW Emissions	30.56	62.84	115.39	5.46	0.82	0.52	15,874
Operational Emissions Increases Fraction of Wayne County Emissions	0.01	0.003	0.02	0.001	0.0001	0.0003	0.02
PSD Threshold	250	250	250	250	250	250	N/A

Key: SO_x – sulfur oxides; CO₂e (mt) = carbon dioxide equivalent in metric tons; NA = not available; N/A = not applicable.

4.2.2.1.1 Auxiliary Airfields

Emissions from the operation of KC-46A aircraft would occur within the immediate areas of Kinston Regional Jetport and aircraft flight routes between this area and Seymour Johnson AFB. Table 4-13 summarizes the annual emissions that would result from proposed KC-46A aircraft operations at the Kinston Regional Jetport. These data show that the increase in KC-46A emissions at this location would not exceed a PSD threshold. In addition, these emissions would amount to no more than 5 percent of any total criteria pollutant generated within Lenoir County in 2011. KC-46A aircrews from Seymour Johnson AFB would use other auxiliary airfields on only an occasional basis, and these operations would result in only minor increases in emissions at those locations. Therefore, KC-46A operations at auxiliary airfields under the proposed MOB 3 mission would not result in significant impacts.

Table 4-13. Annual Emissions from the Proposed MOB 3 Mission at the Auxiliary Airfield Near Seymour Johnson AFB, 2019

Auxiliary Airfield	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Kinston Regional Jetport	0.40	4.94	94.04	4.67	0.28	0.23	13,007
Operational Emissions Fraction of Lenoir County Emissions	0.0002	0.0004	0.05	0.02	0.0001	0.0003	0.04
PSD Threshold	250	250	250	250	250	250	N/A

Key: SO_x – sulfur oxides; CO₂e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Operation of the proposed MOB 3 mission at Seymour Johnson AFB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. These sources would be mobile and intermittent in nature, and in the case of KC-46A flight operations, they would occur up to an altitude of 3,000 feet AGL and across several square miles that comprise the Seymour Johnson AFB airspace and adjoining aircraft flight patterns. As a result, these emissions would be adequately dispersed through a large volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Therefore, operation of the proposed MOB 3 mission would produce minimal ambient impacts of HAPs in a localized area at Seymour Johnson AFB.

4.2.2.2 *Climate Change Effects*

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-11 shows that construction for the proposed MOB 3 mission at Seymour Johnson AFB would produce a total of 1,391 metric tons of CO₂e emissions. Tables 4-12 and 4-13 show that operation of the proposed MOB 3 mission at Seymour Johnson AFB would result in a net increase of 28,881 metric tons per year of CO₂e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB, the following considers how climate change may impact proposed operations at Seymour Johnson AFB. For Seymour Johnson AFB, the projected climate change impact of concern is increased temperatures, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Southeast region surrounding Seymour Johnson AFB will mainly experience warmer temperatures and a resulting increase in the frequency, intensity, and duration of extreme heat events. This increased heat will negatively affect public health, natural and built environments, energy, agriculture, and forestry.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.2.3 **Safety**

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Seymour Johnson AFB with implementation of the proposed KC-46A MOB 3 mission.

4.2.3.1 *Flight Safety*

Aircraft Mishaps – The proposed KC-46A MOB 3 mission at Seymour Johnson AFB would replace the existing KC-135 mission. As described in Section 4.1.3, the KC-46A is a variant of the existing B-767 aircraft. The B-767 has a proven safety record.

As described in Section 4.1.3, the accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (the B-767). Using the comparable Class A accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Operation of the KC-46A is not anticipated to create additional flight safety risks, because the KC-46A would utilize the existing KC-135 flight patterns and existing air refueling (AR) tracks. Replacement of 16 KC-135 aircraft with 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents at Seymour Johnson AFB.

Therefore, implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or in any increase in the risks of occurrence of those mishaps, even with increased flight operations.

Bird/Wildlife-Aircraft Strike Hazard – The increase of operations associated with the beddown of KC-46A would increase the risk of bird/wildlife-aircraft strike risks at Seymour Johnson AFB.

Seymour Johnson AFB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to bird/wildlife-aircraft strike hazard issues.

4.2.3.2 Ground Safety

No aspects of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB are expected to create new or unique ground safety issues not already addressed by current policies and procedures. O&M procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Seymour Johnson AFB airfield safety conditions would still be similar to baseline conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

As indicated in Section 3.2.7, there is incompatible residential development within the APZ. Seymour Johnson AFB would continue working with communities and developers to highlight the Air Installations Compatible Use Zones (AICUZ) guidelines. See Volume II, Appendix B, Figure B-1 of the Draft EIS, for the typical generic CZ and APZ dimensions.

4.2.4 Soils and Water

4.2.4.1 Soil Resources

All of the C&D activities associated with implementing the proposed KC-46A MOB 3 mission would occur within the Seymour Johnson AFB boundary. The disturbed area for the projects associated with the proposed KC-46A MOB 3 mission would be less than 5 acres (new construction).

All of the proposed construction, renovation, and demolition activities would occur in areas already developed and/or previously disturbed by excavation near the northern end of the runway.

Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.2.4.2 Water Resources

The construction projects would follow the principles outlined in Sections 8 and 9 of the Seymour Johnson AFB Stormwater Plan (SWP) titled “*Construction Stormwater Management and Post-Construction Site Runoff Controls*” in accordance with the Seymour Johnson AFB National Pollutant Discharge Elimination System (NPDES) Permit NCS0000335; Section E (Seymour Johnson AFB 2015c). Section E of NPDES Permit NCS0000335 references the NPDES North Carolina Department of Environmental Quality (NC DEQ) General Construction Permit NCG010000. For a project to be covered under Permit NCG010000, the project must have an Erosion and Sediment Control Plan approved by the NC DEQ Division of Land Resources Erosion and Sediment Control Program. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

The areas planned for development as part of the proposed MOB 3 mission are located in subbasin 12, which has an existing impervious surface of approximately 106 acres (Seymour Johnson AFB 2015a). Less than 5 acres of impervious surface would be added to the existing impervious surface of this subbasin resulting in less than a 5 percent increase in impervious surface in subbasin 12 and a less than one percent increase of impervious surface over the entire installation. Although the additional impervious surface would increase sheet flow and stormwater runoff, the demolition projects undertaken at Seymour Johnson AFB since 2007 have decreased the amount of impervious surface on base by 65.15 acres. The addition of less than 5 acres of impervious surface would result in a net decrease in impervious surface (Seymour Johnson AFB 2015a).

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 USC §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site’s pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

The Stormwater Plan (SWP) for Seymour Johnson AFB also identifies control practices to be followed for spill prevention and response, routine inspection of discharges at sites, and proper training of employees. NPDES Permit NCS000335 requires the base to develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to 1 acre, and from projects that disturb less than 1 acre but are part of a larger common plan of development or sale that discharge into the small MS4 for the base.

No changes to the existing aircraft deicing operations would be necessary with implementation of the proposed KC-46A MOB 3 mission. KC-46A deicing activities would be conducted away from storm drains to prevent deicing effluent from entering the stormwater system.

As part of the proposed beddown, the SWP would be revised to include an evaluation of deicing procedures and a revision to the SWP to minimize the use of deicing materials and prevent the release of deicing materials from entering stormwater systems if required. In addition, the revised SWP would include an evaluation of the means that may be practicable for modifying current use and practices to collect deicing effluent runoff.

Regarding the North Carolina Coastal Area Management Act, the USAF submitted a negative Federal Consistency Determination letter to the NC DEQ, Division of Coastal Management on 3 May 2016. The letter documented that Wayne and Lenoir Counties are not in the 20 coastal counties and the implementation of the proposed MOB 3 mission would not affect coastal areas. In a letter dated 4 May 2016, the NC DEQ, Division of Coastal Management concurred with the USAF negative determination letter and indicated that a Federal Consistency Determination is not necessary (see letter dated 4 May 2016, Volume II, Appendix A, Section A.2.4). Significant impacts to water resources at Seymour Johnson AFB would not result from implementation of the proposed MOB 3 mission.

4.2.4.3 Floodplains

Significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission because there are no floodplains near the 916 ARW parking ramp where the infrastructure development is proposed.

4.2.5 Biological Resources

4.2.5.1 Vegetation

All of the proposed projects would occur in developed or disturbed areas within the improved grounds on base. Therefore, no significant impacts to vegetation are anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.2 *Wildlife*

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. The areas planned for development for the proposed MOB 3 mission at Seymour Johnson AFB provide little wildlife habitat, and the proposed projects would result in no significant impacts to wildlife populations.

Noise resulting from the proposed construction would be localized, short-term and only during daylight hours. Wildlife in the areas proposed for construction and near the airfield is already exposed to aircraft noise under baseline conditions.

Airfield operations are anticipated to increase at Seymour Johnson AFB. An increase in operations would increase the potential for bird/wildlife-aircraft strikes. However, continued adherence to the base's BASH Plan (Seymour Johnson AFB 2015b) would minimize the risk of strikes. Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would increase off-base areas exposed to noise levels greater than 65 dB $L_{A_{dn}}$ by 1 acre. Significant impacts to wildlife are not anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.3 *Special-Status Species*

Because no special-status species and/or designated critical habitat occur at Seymour Johnson AFB, no impacts to special-status species are anticipated to result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.5.4 *Wetlands*

Because no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

4.2.6 **Cultural Resources**

Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would include the construction of one new two-bay hangar along the existing 916 ARW flightline area. Construction of this facility would require the demolition of Building 4911 and Hangar 4909. New construction would also be required for an expansion to Building 4906 to house the AFE function. Renovations would be required in five buildings (4810, 4822, 4828, 4908, and 4916) to accommodate mission personnel and equipment storage. Building 4901 would be used to house the Combat Crew Communication, but no renovations would be required. Seymour Johnson AFB has determined that none of these facilities are NRHP-eligible, and the SHPO has concurred with this finding (see letter dated 14 June 2016, Volume II, Appendix A, Section A.5.2).

No impacts to archaeological resources are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB. The base has been inventoried for archaeological resources, and no NRHP-eligible archaeological resources have been identified within the installation boundaries. Because ground-disturbing activities would occur in previously disturbed areas, it is extremely unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with Section 106 of the NHPA.

Because Buildings 2130 and 5015 are located outside the APE, there would be no direct impact to historic properties. Indirect impacts on cultural resources from population increase or visual intrusions would be extremely unlikely. With implementation of the proposed KC-46A MOB 3 mission, the population would increase by a small amount relative to the existing population at the base and in the Goldsboro metropolitan area. New construction would occur in the context of an active USAF base, where changes in the infrastructure are common. The viewshed of remaining historic properties would not be affected by the proposed construction.

There are no tribal resources located at Seymour Johnson AFB or in Wayne County. Seymour Johnson AFB has previously initiated consultation with the Eastern Band of the Cherokee Nation. The tribe has indicated that they have no interests in projects in Wayne County (see email dated 14 April 2014 in Volume II, Appendix A, Section A.3).

4.2.7 Land Use

4.2.7.1 Physical Development

The physical development associated with the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would occur adjacent to the flightline where airfield and aircraft O&M support activities occur on a daily basis. None of the physical development associated with implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would impact land use. Subsequent O&M activities for the proposed KC-46A MOB 3 mission would conform to current and future land uses on the base. The physical changes and daily activities on the ground would be confined to the base. The proposed on-base development would have no impact to off-base areas.

4.2.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Seymour Johnson AFB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No noise-related impacts to land use would occur because implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would result in a 1-acre increase in land exposed to noise levels greater than 65 dB $L_{A_{dn}}$. This additional 1 acre of land is not located near any sensitive receptors. The anticipated noise increase to this 1-acre area would not cause unsafe conditions and would not change or conflict with any current or planned land uses in this area. None of the sensitive receptors identified on Figure 4-2 would experience any increases in noise as a result of implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB.

No impacts to land use on or near Kinston Regional Jetport would occur because the KC-46A aircrews would follow the same procedures currently used by KC-135 aircrews at that location. No other changes are proposed at Kinston Regional Jetport. No significant impacts to land use on or off base would result from implementation of the proposed KC-46A MOB 3 mission.

4.2.8 Infrastructure

Refer to Section 3.2.8 for a description of existing infrastructure system capacities and conditions at Seymour Johnson AFB. Table 2-10 provides changes in population that would result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum

demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.2.8.1 Potable Water System

Based on the average usage rate of 125 GPD (UFC 3-230-03) per person, it is anticipated that the increase in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.01 MGD (125 GPD x 115). This increase, combined with the existing peak usage (1.18 MGD) at Seymour Johnson AFB would not exceed the City of Goldsboro water system capacity of 2.0 MGD and impacts would be less than significant.

4.2.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Based on this rate, the proposed increase in population would increase wastewater discharge from Seymour Johnson AFB by 0.01 MGD (120 GPD x 115). Even under peak flow conditions (1.18 MGD), the increase in wastewater discharge would be below the 1.5 MGD that the City of Goldsboro reserves for Seymour Johnson AFB and impacts would be less than significant.

4.2.8.3 Stormwater System

The proposed MOB 3 mission would require demolition of facilities and construction of new facilities. This would take place within the existing developed base flightline and cantonment areas. Table 2-9 identifies projects associated with the proposed MOB 3 mission. The total disturbed area associated with these projects would not exceed 5 acres (the area for new construction), and impacts would be less than significant.

During the short-term construction period for the proposed MOB 3 mission, all contractors would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. Additional stormwater requirements are described in Section 3.2.4.

4.2.8.4 Electrical System

The USEIA estimates that the average household in North Carolina uses 1.1 MWh per month (USEIA 2014). Converting this rate to an hourly rate and assuming 53 new households (i.e. one new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Seymour Johnson AFB by 0.1 MW. This increase, combined with the historical electrical demand (8.57 MW), at Seymour Johnson AFB would not exceed the Duke Progress Energy supply limit of 19.3 MW and impacts would be less than significant.

4.2.8.5 Natural Gas System

The USEIA estimates that the average person in North Carolina uses 7.6 Mcf of natural gas per year (USEIA 2016). Based on this rate, the proposed increase in population (115) would increase natural gas use at Seymour Johnson AFB by 0.1 Mcf per hour or 8.28 Mcf per year. This increase represents

a less than 0.01 percent increase in the 2014 natural gas usage of (121 million cubic feet [MMcf]). Impacts would be less than significant.

4.2.8.6 Solid Waste Management

All solid waste is collected and transported off site for disposal. Off-base contractors completing any C&D projects at Seymour Johnson AFB would be responsible for disposing of waste generated by these activities. Using methodology developed by the USEPA (USEPA 2009b), it is estimated that implementation of the proposed MOB 3 mission would result in 7,305 tons of C&D debris. Additional personnel and dependents associated with the proposed MOB 3 mission would also generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Disposal of the debris would be completed through an integrated C&D debris diversion approach or removal to landfills. The integrated C&D debris diversion approach includes reuse, recycling, volume reduction/energy recovery, and similar diversion actions. The DoD has set a target C&D debris diversion rate of 60 percent by fiscal year 2015 (DoD 2012). Applying this target diversion rate to the potential amount of C&D debris would result in 4,383 tons of C&D debris being diverted for reuse or recycling and 2,922 tons being placed in landfills. The Wayne County Landfill has sufficient capacity to accommodate this material. Based on current usage, this landfill has an expected closure date of 2031.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.2.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Seymour Johnson AFB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Construction-related traffic would comprise a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with these activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the proposed facility and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term impacts to on- or off-base transportation systems are anticipated.

Implementation of the proposed MOB 3 mission at Seymour Johnson AFB would result in a minor increase of 53 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would result in a less than 1 percent increase in daily commuting traffic to and from the base. In addition to the personnel-related traffic increase, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. This increase in base

mission personnel could increase congestion and queuing during morning and evening rush hours. To minimize the potential for adverse impacts, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gates to process security checks during peak hours. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result as a result from implementation of the proposed MOB 3 mission at Seymour Johnson AFB.

4.2.9 Hazardous Materials and Waste

4.2.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management protocol specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would not add any new hazardous materials that would exceed the base's current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the replacement of the KC-135 mission with the KC-46A MOB 3 mission.

4.2.9.1.1 Aboveground and Underground Storage Tanks

New and remodeled facilities would require the addition of new ASTs to support generators, as well as new hazardous material and waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. AST 4909-1 (generator tank) would be removed with the demolition of Building 4909. The Seymour Johnson AFB Spill Prevention, Control, and Countermeasures (SPCC) Plan and Installation Emergency Management Plan (IEMP) would subsequently need to be revised to incorporate any changes in facility design, construction operation, or maintenance that materially affects the potential for an uncontrolled release of petroleum products (Seymour Johnson AFB 2014b, 2014c).

4.2.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission. Any renovation, construction, or demolition project proposed at Seymour Johnson AFB would be reviewed to determine if ACM is present. As shown in Volume II, Appendix F, Table F-2, Hangar 4909 and Buildings 4810, 4828, and 4908 are proposed for modification and contain ACM. All handling and disposal of ACM wastes would be performed in accordance with the Seymour Johnson AFB *Asbestos Operating Plan* (Seymour Johnson AFB 1997) and in compliance with Federal, state, and local regulations. Before initiating any demolition or ACM work, required notifications to the Health Hazards Control Unit of the North Carolina Department of Health and Human Services, Division of Public Health, would be completed. This notification and an Asbestos Permit application (if applicable) must be submitted 10 days before beginning work. Work on ACM projects would only be conducted by persons accredited by the State of North Carolina and with current certificates of training in accordance with standards established by OSHA and the USEPA. All ACM wastes would be disposed of at an approved landfill.

All renovation and C&D projects proposed at Seymour Johnson AFB would be reviewed to determine if LBP or lead containing materials are present, and whether such materials would be

disturbed. To the extent possible, the presence of lead within the work area would be identified prior to work beginning. Hangar 4909 and Buildings 4810, 4828, and 4908 are proposed for modification and are known to contain LBP or lead-containing material. Volume II, Appendix F, Table F-2, contains a list of three additional buildings proposed for modification that have the potential to contain lead. If the presence of lead containing material in the project work area is unknown, the shop and real property records would be reviewed to determine the presence of lead. If the presence of lead containing material in the work area is still unknown, sampling and analysis for lead would be conducted. The handling and disposal of lead wastes would be conducted in accordance with the Seymour Johnson AFB Hazardous Waste Management Plan (HWMP) (Seymour Johnson AFB 2015f), and in compliance with Federal, state, and local requirements and regulations.

Because some of the buildings proposed for renovation or demolition were constructed prior to 1980, it is assumed that those buildings could include polychlorinated biphenyl (PCB)-containing materials (caulks and sealants). The buildings that would be affected by demolition and renovation, their years of construction, and the potential for PCB-containing materials to be present are summarized in Volume II, Appendix F, Table F-2. The base indicated that some sealants and caulks on Seymour Johnson AFB have tested positive for PCBs. If PCB-containing materials are present, these materials would be removed, handled, and disposed of in accordance with Federal and state regulations and the Seymour Johnson AFB HWMP (Seymour Johnson AFB 2015f).

Although minor increases in the management requirements for ACM, LBP, or PCB removal are anticipated, no adverse impacts are anticipated to result from implementation of the KC-46A MOB 3 mission at Seymour Johnson AFB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.2.9.2 Hazardous Waste Management

Section 4.1.9.2 describes the hazardous waste management specific to the KC-46A aircraft. Seymour Johnson AFB would continue to operate as an LQG and would generate hazardous wastes during various O&M activities associated with the proposed KC-46A MOB 3 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. No new hazardous materials would be added that exceed the base's current hazardous waste processes. The Seymour Johnson AFB HWMP (Seymour Johnson AFB 2015f) would be updated to reflect any change in disposal procedures or any changes of hazardous waste generators and waste accumulation points. No adverse impacts are anticipated from the potential increase in volume of hazardous waste. All hazardous wastes would be handled and managed in accordance with Federal, state, and local regulations.

4.2.9.3 Environmental Restoration Program

There are 63 Environmental Restoration Program (ERP) sites at Seymour Johnson AFB that are administered in accordance with the Management Action Plan. None of the proposed construction, demolition, or renovation projects associated with the proposed KC-46A MOB 3 mission at Seymour Johnson AFB are on or directly adjacent to active ERP sites. However, there is the possibility that undocumented contaminated soils and/or groundwater from historical fuel spills may be present. If encountered during C&D-related excavations, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be

encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

4.2.10 Socioeconomics

4.2.10.1 Population

The current personnel at Seymour Johnson AFB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-8. Implementation of the proposed MOB 3 mission would potentially add up to 38 full-time mission personnel (not including contractors) and 62 military and DoD civilian dependents to Wayne County, resulting in an approximate 0.08 percent county population increase. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population and would not be migrating to the area.

4.2.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-8, implementation of the proposed MOB 3 mission at Seymour Johnson AFB would increase the full-time work force assigned to Seymour Johnson AFB by 53 total personnel (including contractors). Using the IMPLAN model, the direct effect of 53 full-time personnel at Seymour Johnson AFB would have an estimated indirect and induced effect of approximately 22 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, retail, offices of physicians, nursing, and real estate. With a 2014 unemployment rate of 6.3 percent in Wayne County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that \$103.4 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The majority of MILCON expenditures (\$98.4 million) would occur in 2017, with an estimated \$5 million occurring in 2019. The total expenditures could generate 1,144 jobs, primarily within the construction industry or related industries, including maintenance and renovation, wholesale trade, retail stores (i.e., non-store retailers, miscellaneous store, general merchandise, and gasoline stations), hospitals, and limited-service and full-service restaurants. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 53,587 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of \$103.4 million at Seymour Johnson AFB would generate an estimated \$13.7 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.2.10.3 Housing

Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 38 off-base housing units. Based on the number of

vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.2.10.4 Education

As described in Section 2.5.2.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 37 dependents would be of school age and would enter any of the schools in the Wayne County Public School (WCPS) District. The projected number of incoming students would represent a 0.19 percent increase of the current total enrollment in the district. Based on the size of the school district in the ROI, as well as class size for the state, it is anticipated that the schools in the Wayne County would have the capacity to support the incoming population. Students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. Based on current funds spent per student in the district, an additional \$8,823 per student could be required from funding sources to support the incoming student population.

4.2.10.5 Public Services

Wayne County represents a large community with police, fire, and other services. The estimated addition of 100 USAF-related personnel and dependents would represent a 0.08 percent increase of the existing Wayne County population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 0.1 percent]).

4.2.10.6 Base Services

Because the proposed MOB 3 mission would replace the existing KC-135 mission, base services have adequate capacity under the existing infrastructure. Some facilities could require infrastructure improvements in the near future. A new child development center (CDC) facility is currently in the base plans for construction.

4.2.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The environmental justice analysis focuses on populations in the affected area. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes those areas that are exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.2.11 provides baseline conditions of the number of minority, low-income, youth, and elderly populations currently exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater.

Aircraft-generated noise levels of 65 dB $L_{A_{dn}}$ or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise. Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

In accordance with USAF EIAP guidelines, the community of comparison (COC) in environmental justice analysis is the “smallest set of Census data encompassing the ROI for each resource and is used to establish appropriate threshold for comparison analysis” (USAF 2014a). For minority, low-income, youth, and elderly populations, the most recent American Community Survey (ACS) data for census block groups was used for the ROI. Wayne County is the county that encompasses the affected area is therefore defined as the COC for the environmental justice analysis for Seymour Johnson AFB.

The potential for disproportionate impacts to minority or low-income populations was determined by comparing the percent of each population in the respective ROI with the percent of each population in the respective COC. If the ROI percentage is less than the COC percentage, then there would be no disproportionate impacts. If, however, the ROI percentage is greater than or equal to the COC percentage, disproportionate effects could be present and could require mitigation (USAF 2014a).

Analysis of the noise contours resulting from implementation of the proposed MOB 3 mission relative to the baseline contours at Seymour Johnson AFB indicates that no minority or low-income persons, on or off-base, would be exposed to noise levels greater than baseline conditions. Therefore, implementation of the proposed MOB 3 mission at Seymour Johnson AFB would not result in disproportionate impacts on these populations. In addition, no youth (under 18) or elderly (65 and over) individuals would be exposed to increased noise levels.

THIS PAGE INTENTIONALLY LEFT BLANK

4.3 TINKER AIR FORCE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Tinker AFB. Section 2.5.3 describes the facilities and infrastructure, personnel, and flight operations requirements of the KC-46A MOB 3 mission and the specific actions at Tinker AFB that would be required to implement this mission. As described in Section 4.5, the No Action Alternative would mean that the KC-46A MOB 3 mission would not be implemented at Tinker AFB at this time. No facility or personnel changes would occur, and no changes to existing base aircraft would occur; operations at Tinker AFB would continue as described for baseline conditions. The 507 ARW would continue their aerial refueling mission as described under baseline conditions.

4.3.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would occur with implementation of the proposed KC-46A MOB 3 mission. The L_{Adn} noise levels resulting from the proposed MOB 3 mission at Tinker AFB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section can be found in Volume II, Appendix B, Section B.1.3.

The proposed KC-46A MOB 3 mission at Tinker AFB would replace the KC-135 aircraft with the KC-46A aircraft. Other operations ongoing at Tinker AFB under baseline conditions would remain unchanged. At a distance of 1,000 feet, KC-46A aircraft are 9 dB quieter during approach and roughly equal in loudness during departure compared to the KC-135 aircraft that currently operate at Tinker AFB (Table 4-14). The aircraft that operate at Tinker AFB during depot maintenance (i.e., E-3, E-8, F-35, B-1, and B-52H) are all louder than the KC-46A.

KC-46A aircrews would use the same flying procedures (e.g., ground tracks, altitude profiles) currently used by KC-135 aircrews. Tactical flight procedures, which may include non-standard approaches and spiraling climb-outs, are almost entirely practiced in flight simulators by both KC-135 and KC-46A aircrews. While KC-135 operations rarely include tactical training in the aircraft, approximately 3 percent of KC-46A operations would be tactical.

Table 4-14. Aircraft Noise Level Comparison at Tinker AFB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
KC-135	65% NF	83	76	64	54
E-3	1.5 EPR	99	89	74	64
E-8	1.25 EPR	94	84	67	55
B-1	90% RPM	92	84	73	62
B-52H	2,625 LBS/HR	96	86	70	57

Table 4-14. Aircraft Noise Level Comparison at Tinker AFB (Continued)

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
KC-46A	92% N1	87	78	65	55
KC-135	90% NF	87	80	69	59
E-3	1.87 EPR	101	93	81	71
E-8	1.85 EPR	98	89	76	66
B-1	97.5% RPM A/B	118	110	98	89
B-52H	1.55 EPR	104	95	81	70

Note: 507 ARW KC-135 aircraft are R models, which are substantially quieter than earlier models.

Key: Power Units: N1 = engine speed at location 1; NF = fan speed; EPR = engine pressure ratio; RPM = revolutions per minute; LBS/HR = pounds of fuel burned per hour; A/B = afterburner

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59°F and 70 percent relative humidity.

KC-46A aircrews would fly 168 percent more airfield operations annually than are flown by KC-135 aircrews under baseline conditions. In the context of an airfield supporting more than 36,000 aircraft operations per year, this would amount to less than a 13 percent increase in total annual aircraft operations at Tinker AFB. The days of the week on which KC-46A aircrews would fly would be the same as those on which KC-135 aircrews currently fly. Furthermore, KC-46A aircrews would fly the same percentage (11 percent) of total operations during acoustic night (i.e., between 10:00 P.M. and 7:00 A.M.) as KC-135 aircrews. Noise generated during acoustic night has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the L_{Adn} noise metric.

Areas that would be exposed to elevated noise levels with implementation of the proposed MOB 3 mission are compared to baseline conditions on Figure 4-3. The methodology used to calculate noise levels is described in Volume II, Appendix B, Section B.1.3.

The number of off-base acres affected by noise levels greater than 65 dB L_{Adn} would increase by 7 acres (from 2,586 to 2,593) (see Table 4-15). On-base acreage affected by noise levels greater than 65 dB L_{Adn} would increase by 29 acres (a 1 percent increase, from 2,624 to 2,653 acres). Changes in noise levels would be minor, for several reasons. Although the proposed MOB 3 mission would include about 4,000 more airfield operations per year than the existing KC-135 mission, the increase would occur in the context of an airfield supporting 36,000 total aircraft operations. Additionally, the proposed KC-46A operations would be quieter than the operations of the existing KC-135 aircraft, the other based aircraft types (i.e., E-3 and E-8), and the aircraft that operate at Tinker AFB as part of depot maintenance (i.e., E-3, E-8, F-35, B-1, and B-52 H), as well as many of the aircraft that visit the base as transients (see Table 4-14).

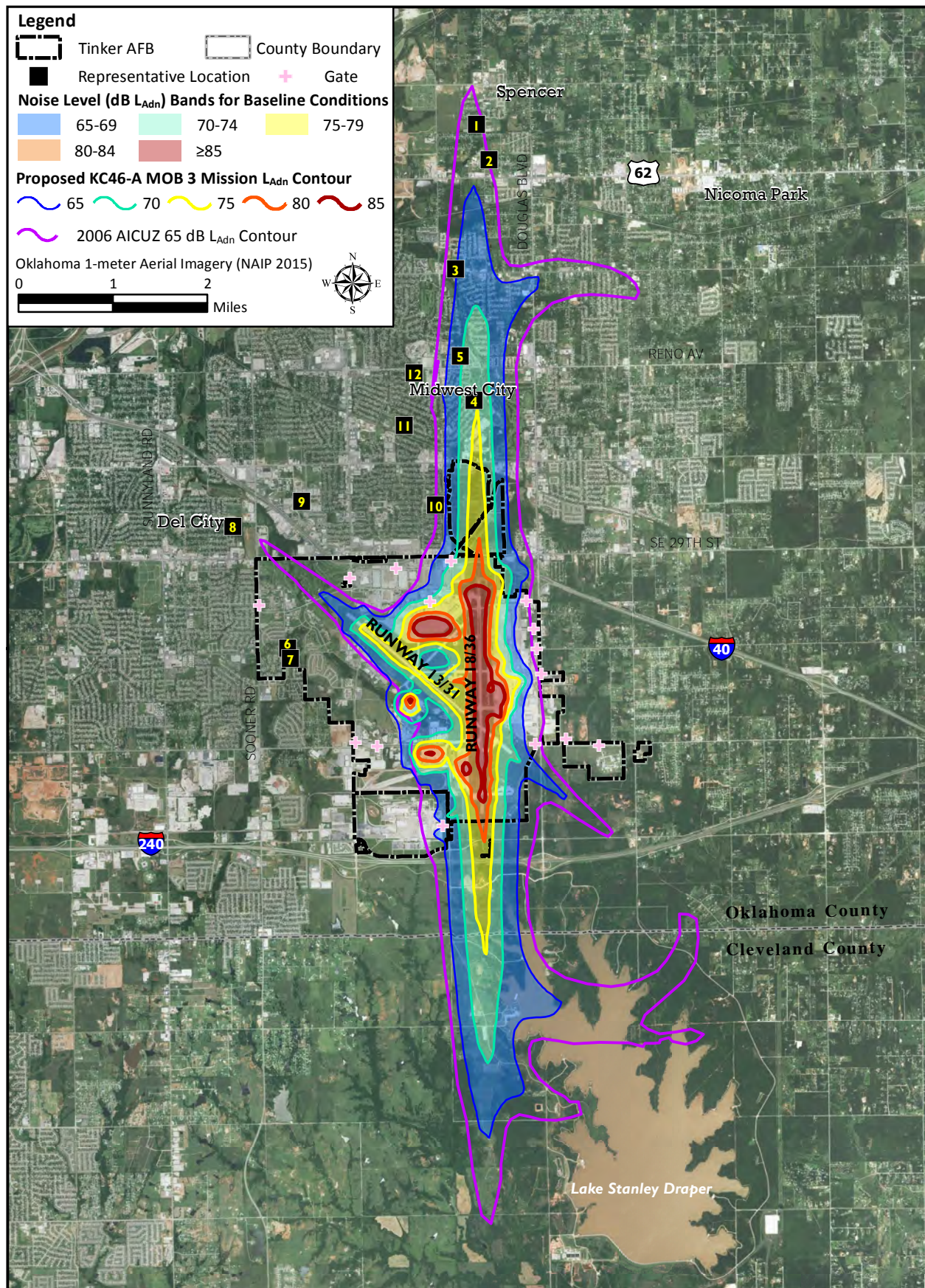


Figure 4-3. Baseline and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Tinker AFB

Table 4-15. Acres Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB

Noise Level (dB L _{Adn})	Area (in acres) Exposed to Indicated Noise Levels								
	Baseline			Proposed MOB 3 Mission			Change		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 - 69	762	1,674	2,436	736	1,677	2,413	-26	+3	-23
70 - 74	646	743	1,389	669	745	1,414	+23	+2	+25
75 - 79	613	163	776	633	164	797	+20	+1	+21
80 - 84	339	6	345	348	7	355	+9	+1	+10
≥ 85	264	0	264	267	0	267	+3	0	+3
Total	2,624	2,586	5,210	2,653	2,593	5,246	+29 (+1%)	+7 (<+1%)	+36 (+1%)

Note: “+” indicates an increase and “-” indicates a decrease.

As presented in Table 4-16, the estimated off-base population affected by noise levels greater than 65 dB L_{Adn} would increase by 6 persons (less than 1 percent, from 5,264 to 5,270 persons). Methods used to estimate the number of people affected are described in Volume II, Appendix B, Section B.1.3.

Table 4-16. Estimated Off-Base Population Exposed to Noise Resulting from Baseline and the Proposed MOB 3 Mission at Tinker AFB

Noise Level (dB L _{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels		
	Baseline	Proposed MOB 3 Mission	Change
65 - 69	3,859	3,865	+6
70 - 74	1,390	1,390	0
75 - 79	15	15	0
80 - 84	0	0	0
≥ 85	0	0	0
Total	5,264	5,270	+6 (<+1%)

Note: “+” indicates an increase and “-” indicates a decrease.

According to current DoD policy, persons exposed to 80 dB L_{Adn} over a very long period, with no barriers to the noise, are at an increased risk of NIPTS, commonly referred to as hearing loss (USD 2009). Although noise levels exceeding 80 dB L_{Adn} would affect 1 additional acre of off-base land, examination of aerial photography and land use data indicates that no persons reside in this area. On-base areas that are affected by noise levels greater than 80 dB L_{Adn} include areas along the flightline. No additional buildings would be affected by noise levels greater than 80 dB L_{Adn} with implementation of the proposed MOB 3 mission. Hearing loss risk among people working in high-noise environments on Tinker AFB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Tinker AFB are presented in Table 4-17. Noise levels would change by less than 1 dB at all of the locations studied.

Table 4-17. Cumulative Aircraft Noise Levels Resulting from Baseline and the Proposed MOB 3 Mission at Representative Locations Near Tinker AFB

Location ID	Location Description	Aircraft Noise Level (dB L _{Adn})		
		Baseline	Proposed MOB 3 Mission	Change
1	Star Spencer High School	62	62	0
2	Spencer Road Christian School	62	62	0
3	Willow Brook Elementary School	66	66	0
4	Steed Elementary School	75	75	0
5	Midwest City Library	70	70	0
6	CDC West	42	42	0
7	Tinker Elementary School	44	44	0
8	Kerr Middle School	53	53	0
9	Rose State College	59	59	0
10	Eastside Elementary School	43	43	0
11	Country Estates Elementary School	58	58	0
12	Monterey Middle School	59	59	0

C&D activities in support of the proposed MOB 3 mission would be conducted in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Although equipment would be muffled, construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of equipment mufflers and would be temporary and intermittent, lasting only the duration of the project. Furthermore, construction activities would be expected to take place during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise, but noise impacts would not be substantial enough to be considered significant.

Noise impacts resulting from the proposed MOB 3 mission at Tinker AFB would not be expected to be perceived as significant. No mitigation measures are proposed at this time.

4.3.2 Air Quality

The following air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Tinker AFB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the net change in emissions from existing KC-135 aircraft operations to the projected KC-46A operations. Volume II, Appendix D, Section D.3.1, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Tinker AFB.

Oklahoma County, which encompasses Tinker AFB, currently attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these areas. This criterion is being used only to determine if an impact occurs, as the area is in attainment and a PSD analysis is not required.

Construction – The proposed MOB 3 mission at Tinker AFB would require construction and/or renovation of airfield facilities, including training facilities, hangars, ramps, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions ($PM_{10}/PM_{2.5}$) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Tinker AFB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes the standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Tinker AFB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.3.1). Emissions from on-wing testing of KC-46A aircraft engines are based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Tinker AFB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from stationary and area sources were estimated by multiplying existing emissions generated at Tinker AFB for these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs. To be consistent, the analysis uses this approach to estimate stationary and source emissions at each of the four bases. In general landings and take-offs are a good indicator of operational tempo at an AFB. However, it is expected that this approach overestimates emissions from the proposed MOB 3 mission at Tinker AFB because aircraft maintenance and non-aircraft operations dominate base activities.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019 after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually be replaced with newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for the 507 ARW, which the MOB 3 mission would replace, at Tinker AFB (see Table 3-28).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.3.2.1 Air Quality Consequences

Table 4-18 presents estimates of emissions that would occur from infrastructure changes (see Table 2-11) for the proposed MOB 3 mission at Tinker AFB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-18. Total Construction Emissions for the Proposed MOB 3 Mission at Tinker AFB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Demolition	0.04	0.13	0.35	0.00	0.46	0.07	99
Building Construction/Renovations	0.89	4.67	6.48	0.01	5.47	1.14	1,284
Ramp and Shoulder Expansion - Pour Concrete	0.01	0.30	0.05	0.00	0.05	0.01	16
Ramp and Shoulder - Re-Stripe	0.04	0.21	0.27	0.00	0.27	0.05	47
Total Emissions	0.98	5.31	7.15	0.01	6.25	1.27	1,447
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO₂e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-19 summarizes the annual operational emissions within Oklahoma County that would result from implementation of the proposed MOB 3 mission at Tinker AFB. These data show that the net increase in emissions from the replacement of existing KC-135 aircraft operations with operations from 12 KC-46A aircraft would not exceed 250 tons per year for VOCs, CO, sulfur oxides (SO_x), PM₁₀, or PM_{2.5}. In addition, these emission increases would amount to no more than 2 percent of any total criteria pollutant generated within Oklahoma County in 2011 (see Table 3-27). Therefore, implementing the proposed MOB 3 mission at Tinker AFB would not result in significant impacts to these pollutant levels. However, these data also show that the net increase in NO_x emissions would exceed 250 tons per year. KC-46A aircraft operations and point and area source emissions would be the primary contributors to these emission increases.

Table 4-19. Annual Operations Emissions from the Proposed MOB 3 Mission at Tinker AFB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC-46A Aircraft Operations	20.12	78.25	263.71	14.65	0.96	0.82	40,444
On-Wing Aircraft Engine Testing – KC-46A	11.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.05	0.28	0.29	0.00	0.04	0.04	68
GMVs	0.03	1.40	0.18	0.00	0.02	0.01	129
POVs – On Base	0.01	0.66	0.04	0.00	0.01	0.00	69
POVs – Off Base	0.40	36.41	2.53	0.02	0.38	0.10	3,372
Point and Area Sources	68.12	31.91	41.84	2.92	3.51	2.55	NA
Total Proposed MOB 3 Mission Emissions	100.30	188.64	327.32	19.28	5.08	3.66	48,581
Existing 507 ARW Emissions	(26.67)	(81.55)	(70.53)	(5.86)	(1.82)	(1.27)	(16,096)
Proposed MOB 3 Mission Minus 507 ARW Emissions	73.63	107.09	256.78	13.42	3.26	2.39	32,485
Operational Emissions Increase Fraction of Oklahoma County Emissions	0.003	0.001	0.01	0.02	0.0001	0.0004	0.005
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO₂e (mt) = carbon dioxide equivalent in metric tons; NA = not available N/A = not applicable.

Emissions of NO_x resulting from implementation of the proposed MOB 3 mission within Oklahoma County were compared to the most recent Oklahoma County emissions inventory (2011) to determine the relative magnitude of these emissions and their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. The NO_x emission increases that would result from the proposed KC-46A operations would amount to approximately 1 percent of the total NO_x emissions generated by Oklahoma County in 2011 (see Table 3-27). The overwhelming majority of NO_x emissions that would result from the proposed MOB 3 mission would occur from intermittent KC-46A aircraft operations up to an altitude of 3,000 feet AGL and across several square miles that comprise the Tinker AFB airspace and adjoining aircraft flight patterns. These emissions would substantially disperse through this volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Given that Oklahoma County attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to a NAAQS exceedance (emissions and regional area concentrations are directly related). Therefore, the proposed MOB 3 mission at Tinker AFB would not result in significant impacts to air quality.

Operation of the proposed MOB 3 mission at Tinker AFB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and point and area sources would generate the majority of HAPs. As described for the aforementioned NO_x impacts, emissions of HAPs from proposed KC-46A operations would disperse in the atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Emissions of HAPs from point and area sources would occur from a variety of sources at locations throughout Tinker AFB, including boilers, solvent usages, and paint stripping and applications. The numerous locations of these sources and their intermittent operations would result in dispersed ambient concentrations of HAPs. As a result, the combined emissions from all MOB 3 mission sources at Tinker AFB would be expected to produce minimal ambient impacts of HAPs in a localized area.

Early in planning, the USAF reconsidered operational assumptions and projections to avoid or reduce potential impacts to the extent feasible. This resulted in the development of alternatives that reduced the emissions of criteria pollutants to the extent feasible by reducing the number of near-field operations (e.g., landings and take-offs). At this time, the USAF is not aware of any other feasible mitigations that could be applied to further reduce the emissions impact from KC-46A aircraft operations and on-wing engine testing activities.

4.3.2.2 *Climate Change Effects*

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-18 shows that construction for the proposed MOB 3 mission at Tinker AFB would produce a total of 1,447 metric tons of CO₂e emissions. Table 4-19 shows that operation of the proposed MOB 3 mission at Tinker AFB would result in a net increase of 32,485 metric tons per year of CO₂e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Tinker AFB, the following considers how climate change may impact proposed operations at Tinker AFB. For Tinker AFB, the projected climate change impact of concern is increased temperatures and aridity, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the southern Plains region surrounding Tinker AFB will experience warmer temperatures and decreasing precipitation. These conditions will produce more frequent extreme events (e.g., heat waves, droughts, and scarcities of water supplies).

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.3.3 **Safety**

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Tinker AFB with implementation of the proposed KC-46A MOB 3 mission. Tinker AFB has hosted many large aircraft missions in the past, and large aircraft airfield provisions remain in place.

4.3.3.1 *Flight Safety*

Aircraft Mishaps – As described in Section 4.1.3, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (B-767). Using the accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Therefore, implementation of the KC-46A MOB 3 mission at Tinker AFB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or in any increase in the risks of occurrence of those mishaps.

Because the KC-46A would utilize the existing KC-135 flight patterns and the existing AR tracks, the KC-46A is not anticipated to create additional flight safety risks. The proposed basing of 12 KC-46A aircraft is not anticipated to increase the risk of aircraft accidents.

Bird/Wildlife-Aircraft Strike Hazard – The proposed addition of 12 KC-46A aircraft and the associated operations would increase the risk of bird/wildlife-aircraft strike hazards at Tinker AFB. Tinker AFB has hosted multiple large aircraft missions in the past and is familiar with implementation of BASH programs and the risk of bird/wildlife-aircraft strike hazard events in the regional area. Ongoing elements of the Tinker AFB BASH Plan (Tinker AFB 2014a) would continue, with updates as required to address the operations of the KC-46A.

Tinker AFB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to bird/wildlife-aircraft strike hazard issues.

4.3.3.2 Ground Safety

The proposed basing and operation of 12 KC-46A aircraft would require continued close coordination between KC-46A aircrews and air traffic control (ATC). O&M procedures conducted by base personnel would change from current conditions and procedures with AFIs modified for the KC-46A. All current activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission at Tinker AFB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented. Proposed construction, renovation, and infrastructure improvement projects related to the KC-46A MOB 3 mission would be consistent with established APZs, and no significant impacts related to APZs would occur. See Volume II, Appendix B, Figure B-1, for the typical generic CZ and APZ dimensions.

KC-46A operations would occur in an airfield environment similar to the current operational environment at Tinker AFB. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Tinker AFB airfield safety conditions would still be similar to baseline conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

As indicated in Section 3.3.3, there is incompatible residential development in the APZs at Tinker AFB. Tinker AFB would continue working with communities and developers to highlight the AICUZ guidelines.

4.3.4 Soils and Water

4.3.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur within the Tinker AFB boundary, and all of this work would occur on previously disturbed areas. The total disturbed area for the projects proposed as part of the KC-46A MOB 3 mission would be

less than 8 acres (new construction). The proposed projects include the removal of a small deicing fluid recovery basin that is no longer used.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. The *Tinker AFB Storm Water Pollution Prevention Plan* (Tinker AFB 2014b) describes control practices that are generally used at the base to reduce the potential for soil erosion and sediment transport off site. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.3.4.2 *Water Resources*

The proposed 507 ARW ramp expansion would impact approximately 45 linear feet of East Crutcho Creek. The existing culvert would be expanded and fill material for the foundation of the ramp expansion would be placed in the creek. East Crutcho Creek is a jurisdictional water of the United States, and according to the Tulsa District of the U.S. Army Corps of Engineers (USACE), this work would be permitted using Nationwide Permit 39. Because impacts to East Crutcho Creek would be less than 300 linear feet, no mitigation would be required (Ware 2016).

A Finding of No Practicable Alternative (FONPA) would be prepared for this project should Tinker AFB be selected for the proposed MOB 3 mission. The FONPA would be prepared in accordance with 32 *CFR* 989 and AFI 32-7064, “Integrated Natural Resources Management.”

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 *USC* §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site’s pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

Less than 8 acres of impervious surface would be added to the existing impervious surface on the installation. Although the additional impervious surface would increase sheet flow and stormwater runoff, it would not result in long-term adverse impacts to water resources on Tinker AFB.

All necessary permits would be obtained prior to construction of the proposed MOB 3 projects including an Oklahoma Department of Environmental Quality (ODEQ) permit to discharge stormwater associated with construction activities under OPDES General Permit OKR10.

Tinker AFB or the construction contractor would submit an NOI under the NPDES procedures and would prepare a site-specific SWPPP describing control measures to be implemented prior to construction. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

The *Tinker AFB Storm Water Pollution Prevention Plan* (Tinker AFB 2014b) identifies control practices to be followed to minimize or eliminate pollutant discharges from industrial activities into the stormwater runoff leaving the base by implementing control practices at potential stormwater pollutant sources.

Implementation of the SWPPP will maintain Tinker AFB's compliance with the stormwater discharge prohibitions, effluent limitations, and receiving water limitations specified in the ODEQ's Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities (OKR05) and with the illicit discharge detection and elimination minimum control measure in the ODEQ's General Permit for Phase II Small Municipal Separate Storm Sewer System (MS4) Discharges (OKR04). The SWPPP also provides for the proper training of employees and would be updated to reflect the land disturbance associated with the proposed KC-46A MOB 3 development projects.

No significant impacts to water resources at Tinker AFB are anticipated to result from implementation of the proposed MOB 3 mission.

4.3.4.3 *Floodplains*

Minor adverse impacts to floodplains are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB. EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, requires the USAF to avoid, to the extent practicable, any possible long-and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development when there is a practicable alternative. This EO also encourages Federal agencies to plan projects considering a larger flood zone (e.g., the 500-year floodplain). Because the base has mapped the 500-year floodplain, the vertical flood elevation and corresponding horizontal floodplain will be determined using the 500-year floodplain.

Due to the location of KC-135 infrastructure, specific mission requirements, and operation and maintenance facilities necessary to support the proposed KC-46A MOB 3 mission at Tinker AFB, the existing 507 ARW parking ramp would be expanded in place.

Approximately 3.5 acres of the 500-year floodplain would be impacted by ramp expansion (Figure 4-4). During the facility planning, floodplains were identified and avoided where possible. However, due to the extent of the 500-year floodplain on Tinker AFB, particularly around the existing 507 ARW parking ramp, there are no practicable alternatives to expanding the aircraft parking ramp in the 500-year floodplain. Providing adequate parking for the proposed KC-46A MOB 3 aircraft at Tinker AFB is restricted by a variety of different factors, of which the most important are described as follows.

- Operational efficiencies (e.g., existing refueling infrastructure and aircraft storage and maintenance facilities) dictate that the KC-46A aircraft be located on the existing aircraft parking ramp area. Due to the extent of the Federal Emergency Management Agency (FEMA) 500-year floodplain, no other locations outside of the floodplain meet this requirement.

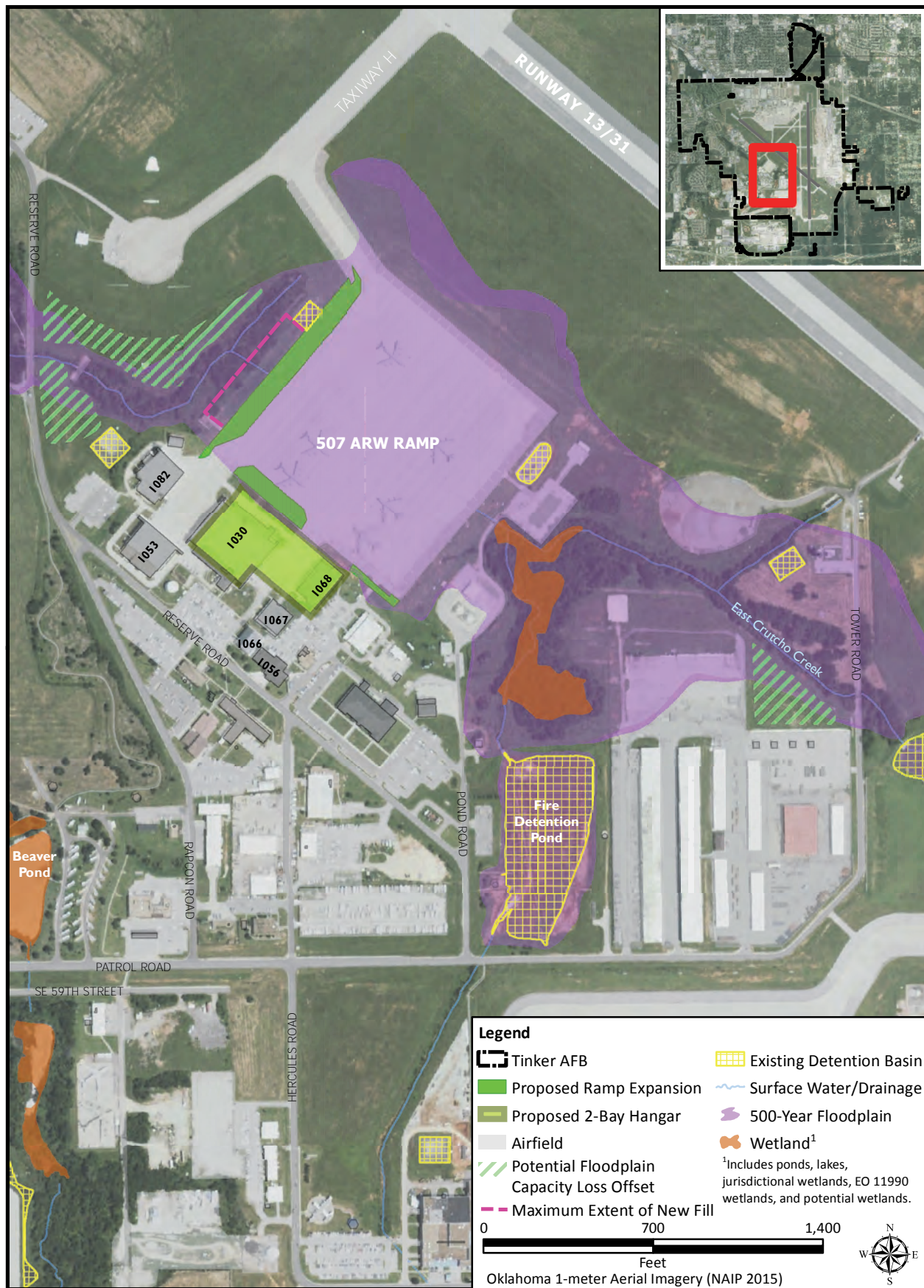


Figure 4-4. Floodplains Near the Proposed 507 ARW Ramp at Tinker AFB

- No other areas are available for parking the proposed KC-46A aircraft on Tinker AFB where these aircraft can be refueled and prepared for training and global mobility missions.
- Access between facilities and the ramps/taxiways cannot exceed a 1-percent slope.

Facility planners considered all of these factors and determined there were no other practicable alternatives for adequate parking for the proposed KC-46A MOB 3 aircraft on Tinker AFB. Following ramp expansion, the disturbed ground would be returned to its pre-construction condition (e.g., elevation, topography, and vegetation).

In order to avoid altering the elevation, function, and capacity of the 500-year floodplain, material would be excavated adjacent to and from within the same floodplain to be used as fill for the proposed ramp expansion. Potential excavation locations for floodplain capacity offset are shown on Figure 4-4. Prior to excavation, utility lines (e.g., natural gas and communications) would be relocated as necessary. In addition, groundwater monitoring wells associated with the ERP program could require removal or replacement. If wells are impacted, the base would coordinate with the regulatory agencies to identify the appropriate course of action for each well.

Use of excavated material adjacent to and from within the same floodplain would ensure that the elevation of floodwaters would not be affected by the proposed ramp expansion. Although modeling using the Hydrologic Engineering Center's River Analysis System or similar system would be used to model the floodplain, no net loss of floodplain elevations, function, or capacity is anticipated. In addition, Tinker AFB would adhere to flood risk management standards detailed in EO 13690, as well as policies and procedures outlined in the *Tinker AFB INRMP* (Tinker AFB 2015a).

To the maximum extent practical, land disturbance in floodplains has been avoided. A FONPA would be prepared should Tinker AFB be selected for the proposed MOB 3 mission. The FONPA would be prepared in accordance with 32 *CFR* 989 and EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*.

Although short-term, minor effects on water resources could result from work in the floodplain of East Crutcho Creek, significant, long-term, adverse effects on water resources at Tinker AFB are not anticipated to result from implementation of the proposed KC-46A MOB 3 mission.

4.3.5 Biological Resources

4.3.5.1 Vegetation

Activities associated with the construction, demolition, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands. Vegetation in these areas are primarily non-native and of low ecological value. These areas are already disturbed for ongoing, routine maintenance and/or landscaping activities. Therefore, no significant impacts to vegetation are anticipated to result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. Noise produced during construction, renovation, and demolition activities would result in short-term, minor impacts to wildlife.

Implementation of the proposed MOB 3 mission at Tinker AFB would increase aircraft operations. Noise impacts resulting from an increase in operations are anticipated to be minimal compared to the existing aircraft noise at Tinker AFB. Continued adherence to the base's BASH Plan (Tinker AFB 2014b) would minimize the potential for bird-aircraft strikes. Significant impacts to wildlife would not occur from implementation of the proposed MOB 3 mission at Tinker AFB.

Although the number of aircraft operations associated with the proposed MOB 3 mission would increase, the noise resulting from these operations would be minor in that only seven additional acres of land off-base would be affected by noise levels greater than 65 dB L_{Adn}. Therefore, only short-term, minor impacts to wildlife are anticipated to result from the implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.3 *Special-Status Species*

Tinker AFB is located near the middle part of the Central Flyway for migratory birds and a variety of different species that are protected under the Migratory Bird Treaty Act (MBTA) are known from this area. In May 2009, the partial remains of a federally threatened piping plover were identified as resulting from an aircraft strike (Tinker AFB 2015a). No additional piping plovers have been identified on Tinker AFB and there are no known nesting records for this species in Oklahoma County (USFWS 2011a). This occurrence is considered rare because they are strictly a spring and fall migratory species in Oklahoma.

On 5 May 2016, the USFWS Oklahoma Ecological Services Field Office (OKESFO) submitted a comment to the project website that indicated the list of species provided in the USAF letter dated 17 March 2016 is accurate and they concur with the species listed (see Volume II, Appendix A, Section A.6) (USFWS 2016g). The OKESFO stated that they do not concur with the "No Effect" determination for the piping plover. The comment indicated that with an increase in aircraft operations, the potential for bird-aircraft strikes would not decrease and the potential exists for additional takes. The comment also expressed concern about other federally-listed migratory birds.

Although increased aircraft operations could increase the potential for future bird strikes, the USAF has not observed a one-to-one correlation between increased aircraft operations and increased bird strikes. Increases in bird strikes at USAF installations are more correlated to migration times (<http://www.af.mil/News/ArticleDisplay/tabid/223/Article/112337/bird-migration-season-increases-bird-strike-risks.aspx>) (Tinker 2014a). Additional documentation indicates that increases in bird-aircraft strikes are generally not attributable to an increase in aircraft operations (https://www.co.sutter.ca.us/pdf/cs/pc/NBHCP_Final_EIR-EIS_Vol_1.pdf).

In response to the USFWS website comment, the USAF submitted a letter to the USFWS on 5 August 2016 (see Volume II, Appendix A, Section A.6). This letter indicated the USAF's intent to prepare a Biological Assessment (BA) to facilitate the regulatory review of potential impacts to threatened and endangered species (the piping plover in particular) resulting from the proposed MOB 3 mission. The letter identified the ROI and indicated that, in addition to the piping plover, the following federally listed species would be included in the BA: least tern, interior population (*Sterna antillarum*) – endangered; whooping crane (*Grus americana*) – endangered; and red knot (*Calidris canutus rufa*) – threatened.

After evaluation of the data for the species mentioned above, the USAF instead prepared a Biological Evaluation (BE) for these same species (See Volume II, Appendix A, Section A.6). The BE was submitted to the USFWS on 19 September 2016. Based on the information contained in the BE, the USAF determined that should Tinker AFB be selected for the proposed

KC-46A MOB 3 mission, implementation of the mission may affect, but is not likely to adversely affect, the least tern, the whooping crane, the red knot, or the piping plover. For the least tern, the whooping crane, and the red knot, this determination is based on the lack of observation of these species at Tinker AFB, the lack of suitable habitat at Tinker AFB, and the migratory nature (thus only temporary presence) of these species in areas surrounding Tinker AFB.

The determination for the piping plover is based on the fact that more than 192,000 aircraft operations have occurred at Tinker AFB since the single piping plover was struck by an aircraft in 2009, with no additional piping plover sightings or strikes occurring in the last 7 years. In addition, no nesting occurrence is known for this species at Tinker AFB or in Oklahoma County, and suitable nesting habitat for piping plover does not occur at Tinker AFB or in Oklahoma County. Any piping plovers occurring in the region are anticipated to be temporary migrants. The likelihood of another piping plover strike is considered extremely unlikely and is therefore discountable (USFWS 1998).

Implementation of the proposed MOB 3 mission at Tinker AFB would increase total annual aircraft operations by less than 13 percent. Tinker AFB currently implements numerous measures to minimize the potential for bird strikes. Since 2001, Tinker AFB has contracted with United States Department of Agriculture (USDA) Wildlife Services to provide daily wildlife control services for Tinker AFB. On a daily basis, two USDA biologists are on Tinker AFB to prevent birds from using the installation. The USDA biologists conduct special runway surveys for bird activity during or immediately following rainfall events. They conduct bird metric surveys using methodology contained within the Integrated Natural Resources Management Plan (INRMP) and the Memorandum of Understanding between the USDA and USAF for these services. These biologists document information such as date, time, weather conditions, species observed, species activity, direction of movement, location on airfield, and control methods, if applicable. They also perform small-scale passive services, such as eliminating roosting sites, bird/wildlife proofing buildings and hangars, and excluding bird/wildlife access to culverts. As needed, for non-special status species, the biologists employ active control methods (e.g., the use of pyrotechnics to disperse hazardous migrating bird populations). They are responsible for renewing and reporting on the bird depredation permit issued by the USFWS for basewide bird control, and they conduct migratory bird protection training on the installation.

Additional measures include quickly filling or repairing any areas of standing water or restricted drainage on the airfield, and seeding or sodding any bare, non-grassy areas resulting from erosion or construction that could create habitat or a food source for birds. All grass areas on the airfield and CZs are managed at a uniform height of 7-14 inches. Areas near the airfield with a variety of grass species are mowed when the average grass height, not including seed heads, exceeds tolerances. Most grass seeds found on the airfield are less desirable as a food source for birds. Grounds maintenance crews begin mowing areas adjacent to runways and finish in the infield or outer most grass areas. This causes insects and other animals to move away from aircraft takeoff and landing areas. The Natural Resources group at Tinker AFB has also identified species-specific measures to minimize bird use of the airfield. For example, the installation has removed fish-producing ponds near the airfield to reduce the presence of waterfowl species such as mergansers and loons.

With regard to aircraft flight operations, all flying organizations on Tinker AFB are updated on bird activity on a daily basis. The USAF implements a variety of different operational minimization measures during migration (spring and fall) to prevent bird strike. These involve changing pattern altitudes, changing pattern directions to avoid bird concentrations, and avoiding

takeoffs/landings at dawn/dusk. During times of high bird activity, Flight Commanders strongly consider reducing or eliminating flight operations within one hour before and after sunrise and sunset.

During times of high bird activity, additional measures can be implemented by air traffic controllers in the Tower to avoid bird strike. These include rescheduling local training or transition elsewhere, raising altitude en-route to low-level or training areas, limiting time on low-level routes to the minimum required for accomplishing training requirements, and selection of low-level routes or training areas based on bird hazard data from the USAF BASH team internet website (e.g., the Bird Avoidance Model, Avian Hazard Advisory System or Low-Level Route Analysis). USAF air traffic controllers also have the authority to discontinue multiple approaches and require aircraft to make full-stop landings only (i.e., no touch and go landings).

Of the six State Species of Special Concern documented on Tinker AFB, only the barn owl, burrowing owl, loggerhead shrike, and Swainson's hawk have potential to migrate through the this area of the Central Flyway. However, continued adherence to the measures described above would minimize the risk of aircraft strike. No nesting habitat for these species occurs on Tinker AFB. In addition to the INRMP and BASH Programs, Tinker AFB complies with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

Because the proposed construction, demolition, and renovation would not occur in the southwestern portion of the base, impacts to the Texas horned lizard would not occur. Populations of Texas horned lizards will continue to be closely monitored at the base.

The proposed facilities and infrastructure changes would not occur within the known Oklahoma penstemon habitat located in the southeastern portion of the base, within the leased land immediately adjacent to and south of Landfill 6, or the near the northeastern portion of Glenwood. Therefore, implementation of the proposed MOB 3 mission at Tinker AFB would not adversely affect this special status plant species.

Approximately 1 acre of forested floodplain habitat would be impacted by the proposed ramp expansion to the west of the 507 ARW ramp. This area is described in the base INRMP as habitat for migratory bird species at risk. The species at risk are defined by the base for the purposes of natural resource management. No Federal or state-listed species are known to use this habitat. Approximately 1,033 acres of habitat for species at risk occur at Tinker AFB. The loss of 1 acre of habitat represents less than 0.1 percent of the available habitat. In order to minimize potential impacts to migratory birds, removal of trees in the vicinity of the proposed parking ramp would not occur during the migratory bird breeding season (1 April – 31 July.)

No significant, adverse impacts to special-status species are anticipated to result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.5.4 Wetlands

No wetlands occur within the immediate areas proposed for development and no direct, significant impacts to wetlands are anticipated. Wetlands are located upstream and downstream of the 507 ARW Ramp. During construction, control measures identified in a site specific stormwater pollution prevention plan would be implemented to minimize impacts to these wetland areas. Short-term, indirect, minor impacts to wetlands could result from implementation of the proposed MOB 3 mission at Tinker AFB.

While no wetlands are located within the area proposed for development, East Crutcho Creek is located in the area proposed for development. Potential impacts to East Crutcho Creek are discussed in Section 4.3.4.

4.3.6 Cultural Resources

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would include construction of two new facilities and additional ramp space. The largest new construction project would be a 2-bay hangar constructed along the existing flightline. Construction of this facility would require the demolition of Buildings 1030, 1067, 1068, and 1069, and the construction of new ramp space. Construction of the new ramp space would result in the demolition of an obsolete deicing detention basin. A new facility to house the KC-46A flight simulators would also be required. Renovations would be required in three facilities (Hangar 1053 and Buildings 1056 and 1082) and within the hydrant fueling system on the existing KC-135 ramp. None of these facilities are in the Historic District, and none are eligible for NRHP listing (Section 3.3.6.1, Table 3-30). The Oklahoma SHPO concurred that there are no known historic properties within the APE of the proposed KC-46A MOB 3 mission at Tinker AFB (see letter dated 6 April 2016, Volume II Appendix A, Section A.5.3).

Tinker AFB has determined that no historic properties would be affected. The SHPO has concurred with this finding and requested additional concurrence on archaeological resources from the Oklahoma Archaeological Survey (OAS). The OAS concluded that prior to any construction, an archaeological field inspection would be required (see letter dated 19 May 2016, Volume II, Appendix A, Section A.5.3). Should Tinker AFB be selected for the proposed MOB 3 mission, an archaeological field inspection of the construction area would be completed.

If any archaeological discoveries were to occur, either during field surveys, or unanticipated or inadvertent discoveries during construction activities, the USAF would comply with Section 106 of the NHPA.

As required by Sections 101(d)(6)(B) and 106 of the NHPA, implementing regulations at 36 *CFR* Section 800.2(c)(2), EO 13175, and DoDI 4710.02, Tinker AFB is consulting with five tribes on a government-to-government basis to identify any traditional cultural properties that may be present on the base. Volume II, Appendix A, Section A.3, contains a record of these consultations. The consultation correspondence includes an invitation to participate in the NEPA process, and an invitation to consult directly with the Tinker AFB base Commander regarding any comments, concerns, and suggestions (see letter dated 28 March 2016, Volume II, Appendix A, Section A.3).

Table A-1 in Volume II, Appendix A, Section A.3, contains a record of tribal consultation up to the publication of this document. No concerns regarding traditional cultural properties, properties of traditional religious or cultural importance, or other cultural concerns have been received to date. The Seminole Nation of Oklahoma expressed an interest in discussing the project with the Commander of Tinker AFB. Col Stephanie Wilson of Tinker AFB met with Chief Harjo of the Seminole Nation of Oklahoma on 5 August 2016. Although Chief Harjo was interested in small business opportunities for the Seminole Nation of Oklahoma, he had no comments or concerns specific to the proposed KC-46A MOB 3 mission. Tinker AFB has completed tribal consultation for the proposed KC-46A MOB 3 mission.

4.3.7 Land Use

4.3.7.1 Physical Development

The proposed C&D projects and renovations to existing facilities at Tinker AFB would all occur within the flightline area where existing airfield and aircraft O&M support activities are located. Because the physical development associated with implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would not result in any changes to existing land use categories, no direct land use impacts would occur. Indirect effects from construction (e.g., noise, dust, and traffic) could result from implementation of the MOB 3 mission. However, these effects would be temporary and minor. The physical changes and daily activities on the ground would be confined to Tinker AFB. Implementation of the proposed projects on Tinker AFB would have no impacts to off-base land use.

4.3.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Tinker AFB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

Even though aircrews associated with the proposed MOB 3 mission would fly more airfield operations per year than are flown by KC-135 aircrews under baseline conditions, the K-46A is slightly quieter during approach and roughly equal in loudness during departure. Depot maintenance aircraft at Tinker AFB are all louder than the KC-46A (see Section 4.3.1.1). The total geographic area exposed to noise from MOB 3 aircraft operations compared to baseline conditions is shown on Figure 4-3. Implementation of the proposed MOB 3 mission would increase off-base lands to noise greater than 65 dB $L_{A_{dn}}$ by 7 acres from 2,586 to 2,593. The anticipated noise increase to these off-base areas would not cause unsafe conditions and would not change or conflict with any existing or planned land uses in this area.

Comprehensive plans, zoning ordinances and other legislative tools used by the communities surrounding the base generally support compatible land use planning and provide for review and protection of the areas surrounding the airfield. Tinker AFB also continues to work with the member communities of the Association of Central Oklahoma Governments by implementing recommended actions from the 2008 Joint Land Use Study (JLUS) and other base planning activities. Although an additional 7 acres and 6 residents would be exposed to noise levels above 65 dB $L_{A_{dn}}$, no significant impacts to on- or off-base land use would result from implementation of the proposed MOB 3 mission at Tinker AFB.

4.3.8 Infrastructure

Refer to Section 3.3.8 for a description of existing infrastructure system capacities and conditions at Tinker AFB. Table 2-13 provides changes in population that would result from implementation of the proposed MOB 3 mission at Tinker AFB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.3.8.1 Potable Water System

Using the average usage rate of 125 GPD (UFC 3-230-03) per person, it is anticipated that the change in population associated with the proposed MOB 3 mission would create an additional water use demand of 0.1 MGD per day (125 GPD x 784). This increase, combined with the existing daily water demand (0.75 MGD) at Tinker AFB would not exceed the base's water system capacity of 6.5 MGD and impacts would be less than significant.

4.3.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate the proposed increase in population would increase daily wastewater discharge from Tinker AFB by 0.1 MGD (120 GPD x 784). This increase, combined with the existing daily wastewater discharge (1.02 MGD), would not exceed the Oklahoma City wastewater system capacity of 101 MGD and impacts would be less than significant.

4.3.8.3 Stormwater System

The proposed MOB 3 mission would require demolition of facilities and construction of new facilities. This would take place within the existing developed base flightline and cantonment areas. Table 2-12 identifies projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 8 acres (the area for new construction), and impacts would be less than significant. During the short-term construction period for the proposed MOB 3 mission, all contractors would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. Additional stormwater requirements are described in Section 3.3.4.

4.3.8.4 Electrical System

The USEIA estimates that the average household in Oklahoma uses 1.1 MW per month (USEIA 2014). Converting this rate to an hourly rate and assuming 308 new households (i.e. 1 new household for each new authorized personnel on base), the proposed increase in population would increase electrical use at Tinker AFB by 0.5 MW. This increase is a small fraction of the 50.8 MW that Tinker AFB has averaged between 2011 and 2014, and impacts would be less than significant.

4.3.8.5 Natural Gas System

The USEIA estimates that the average person in Oklahoma uses 17.8 Mcf of natural gas per year (USEIA 2016). Using this rate, the proposed increase in population (784) would increase natural gas use at Tinker AFB by 1.6 Mcf per hour or 14,016 Mcf per year. This increase is approximately 0.1 percent of the current 9.7 MMcf per year currently used at Tinker AFB and impacts would be less than significant.

4.3.8.6 Solid Waste Management

Using methodology developed by the USEPA to determine the amount of C&D debris, implementation of the proposed MOB 3 mission would result in 11,796 tons of C&D debris (USEPA 2009b). Solid waste generated from the proposed C&D activities would consist of building materials such as concrete, metals (e.g., conduit, piping, and wiring), and lumber.

Disposal of the debris would be completed through an integrated C&D debris diversion approach or removal to landfills. The integrated C&D debris diversion approach includes reuse, recycling, volume reduction/energy recovery, and similar diversion actions. The DoD has set a target C&D debris diversion rate of 60 percent by fiscal year 15 (DoD 2012). Application of the DoD target diversion rate would result in 7,077 tons of C&D debris being diverted for reuse or recycling and 4,718 tons being placed in landfills. It is anticipated that the Southeast Landfill would be able to accommodate this short-term minor increase in capacity. Additional personnel and dependents associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.3.8.7 Transportation

Implementation of the proposed MOB 3 mission at Tinker AFB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities would access the base via the commercial vehicle gate.

Construction-related traffic would minimally add to the total existing traffic volume in the area and on base. Increased traffic associated with C&D activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces. Additionally, intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the base and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities are complete. As a result, no long-term impacts to on- or off-base transportation infrastructure are anticipated.

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would result in an increase of 308 in on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 3 percent increase in daily commuting traffic to and from the base. In addition to the increase in personnel, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. This increase in base mission personnel could increase congestion and queuing at the gates during morning and evening rush hours. To minimize the potential for adverse impacts, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gates to process security checks during peak hours. Regional access roads and the on-base road network

have adequate capacity to absorb the minor amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.3.9 Hazardous Materials and Waste

4.3.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would not add any new hazardous materials that exceed the base's current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the proposed KC-46A MOB 3 mission, but would be expanded to meet the increased use.

4.3.9.1.1 Aboveground and Underground Storage Tanks

The replacement of eight KC-135 aircraft with 12 KC-46A aircraft at Tinker AFB has the potential to increase the maximum daily consumption of Jet-A. The potential increase in fuel consumption would be supported by the current infrastructure at the base. New and remodeled facilities would require the addition of ASTs for use with generators and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. The Tinker AFB Oil and Hazardous Substance Integrated Contingency Plan (ICP) would be amended to capture any changes in facility design, construction, operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products (Tinker AFB 2007).

4.3.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Tinker AFB. Any renovation, construction, or demolition proposed at Tinker AFB would be reviewed to determine if ACM is present. Volume II, Appendix F, Table F-3, contains a list of the seven buildings proposed for modification and their potential to contain ACMs. Additional testing would be conducted where no data exist. All testing and data collection would be conducted in accordance with the *Asbestos Management Plan* (Tinker AFB 2012). Any exposed friable asbestos would be removed in accordance with USAF policy and applicable health laws, regulations, and standards. Written notification to the ODEQ is required for all demolition work and renovation work involving asbestos above certain quantities, per 40 *CFR* 61.145(a) and 61.145(b) (Tinker AFB 2012). Additionally, the handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

All renovation, construction, or demolition projects proposed at Tinker AFB would be reviewed to determine if LBP is present, and whether LBP would be disturbed in the performance of the work. Volume II, Appendix F, Table F-3, contains a list of the seven buildings that would be affected by demolition or renovation, the years of construction, and the potential for LBP. In accordance with the LBP Management Plan (Tinker AFB 2010), any required renovation or demolition activities (e.g., sanding, scraping, or other disturbances of the paint) that could

generate lead dust would not be performed without prior LBP testing. All handling and disposal of wastes would be in compliance with Federal and state regulations.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Tinker AFB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.3.9.2 Hazardous Waste Management

Section 4.1.9.1 describes the hazardous waste management specific to the KC-46A aircraft. Tinker AFB would continue to operate as an LQG and would generate hazardous wastes during various O&M activities associated with the proposed KC-46A MOB 3 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. No new hazardous materials would be added that exceed the base's current hazardous waste processes. No adverse impacts are anticipated from the increased volume of hazardous waste. All hazardous wastes would be handled and managed in accordance with Tinker AFB Instruction 32-7004 (Tinker AFB 2015b), and Federal, state, and local regulations.

4.3.9.3 Environmental Restoration Program

Tinker AFB is divided into four groundwater management units (GMUs). Within these GMUs, there are currently 13 ERP sites. No ERP sites occur in the vicinity of the proposed facilities and infrastructure improvements associated with the KC-46A MOB 3 mission at Tinker AFB (see Section 2.5.3 and Figure 2-11).

The proposed project area is within Site CG038 Southwest Contaminated Groundwater Management Unit. This site is defined for the purposes of investigating solvent and hexavalent chromium groundwater contamination from a variety of sources. Groundwater in the area is typically encountered at approximately 10 feet below ground surface (bgs) and may be encountered during C&D-related excavations. Projects associated with the proposed KC-46A MOB 3 mission at Tinker AFB could require the modification or the abandonment and replacement of three groundwater monitoring wells (2-410B, 2-418B, and 2-542B) associated with the Basewide Groundwater Monitoring Program.

The USAF would coordinate with the AFCEC restoration office before any construction, renovation, demolition, or modification projects are initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with current EIAP processes, as specified in AFI 32-7061. The USAF would ensure that these projects are coordinated with ongoing remediation or investigation activities at any ERP site. However, if existing plans and procedures are followed, there would be no anticipated impacts on these ERP sites.

During C&D activities, there is the potential to encounter contaminated soil and groundwater in areas associated with ERP sites. There is also the possibility that undocumented contaminated soils or groundwater from historical fuel spills may be present. If encountered, storage/transport/disposal of contaminated groundwater/soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil or groundwater contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required.

Tinker AFB would coordinate with the ODEQ prior to any construction activities on an active ERP site. No significant impacts to ERP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near ERP sites.

4.3.10 Socioeconomics

4.3.10.1 Population

The current personnel at Tinker AFB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-12. Implementation of the proposed MOB 3 mission would potentially add up to 293 full-time mission personnel (not including contractors) and 476 military and DoD civilian dependents to Oklahoma County, resulting in an approximate 0.1 percent county population increase. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the proposed MOB 3 mission would be from the local population and would not be migrating to the area.

4.3.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-12, implementation of the proposed MOB 3 mission at Tinker AFB would increase the full-time work force assigned to Tinker AFB by 308 total personnel (including contractors). Using the IMPLAN model, the direct effect of 308 full-time personnel at Tinker AFB would have an estimated indirect and induced effect of approximately 94 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, real estate, wholesale trade, physician offices, general merchandise retail, nursing and care facilities, and other restaurants. With a 2014 unemployment rate of 4.2 percent in Oklahoma County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that \$101 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Tinker AFB. MILCON expenditures would be funded in 2017. The total expenditures could generate 968 jobs, primarily within the construction industry or related industries, including maintenance and repair construction, retail stores (i.e., nonstore retailers, miscellaneous store, general merchandise, gasoline stations), wholesale trade, and real estate. Construction activities would occur during a 2-year period, and it would be possible for a single worker to work on multiple projects. With a labor force of 365,832 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of \$101 million at Tinker AFB would generate an estimated \$31.2 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.3.10.3 Housing

Assuming all incoming full-time mission personnel (not including contractors) would require off-base housing, there would be a potential need for 293 off-base housing units. Based on the

number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.3.10.4 Education

As described in Section 2.5.3.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 286 dependents would be of school age and would enter any of the schools in Oklahoma County. The incoming students would represent a 0.2 percent increase of the current total enrollment in the district. Based on the size of the school district in the ROI, as well as class size for the state, it is anticipated that the schools in Oklahoma County would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.3.10.5 Public Services

Oklahoma County represents a large community with police, fire, and other services. The estimated addition of 769 USAF-related personnel and dependents would represent a 0.1 percent increase of the existing Oklahoma County population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 1 percent]).

4.3.10.6 Base Services

Because the proposed MOB 3 mission would replace the existing KC-135 mission, base services have adequate capacity under the existing infrastructure. Some facilities would require infrastructure improvements in the near future.

4.3.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and sensitive receptor populations would be related to a potential increase in noise levels. The affected area is defined as those areas that are exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.3.11 provides baseline conditions of the number of minority, low-income, youth and elderly populations currently exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater.

Aircraft-generated noise levels of 65 dB $L_{A_{dn}}$ or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as those areas affected by aircraft noise.

Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

In accordance with USAF EIAP guidelines, the COC in environmental justice analysis is the “smallest set of Census data encompassing the ROI for each resource and is used to establish appropriate threshold for comparison analysis” (USAF 2014a). For minority, low-income, youth, and elderly populations, the most recent ACS data for census block groups was used for the ROI. Oklahoma County is the county that encompasses the affected area and is therefore defined as the COC for the environmental justice analysis for Tinker AFB. Disproportionate impact is inherent for all youth and elderly populations. The extent to which youth and the elderly will be impacted is disproportionate due to their inherent vulnerabilities.

The potential for disproportionate impacts to minority or low-income populations was determined by comparing the percent of each population in the respective ROI with the percent of each population in the respective COC. If the ROI percentage is less than the COC percentage, then there would be no disproportionate impacts. If, however, the ROI percentage is greater than or equal to the COC percentage, disproportionate effects could be present and could require mitigation (USAF 2014a).

Analysis of the noise contours resulting from implementation of the proposed MOB 3 mission relative to the baseline contours at Tinker AFB indicates that populations of minority and low-income persons would be exposed to noise levels comparable to those occurring under the baseline conditions (Table 4-20). Implementation of the proposed MOB 3 mission would result in a net change of six additional people within the affected area. The 7 acres of affected area results in a slight change in the number of minority (an overall increase of two) and low-income (an overall decrease of one) individuals residing under the noise contours (Table 4-20). Therefore, implementation of the proposed MOB 3 mission at Tinker AFB is not anticipated to result in disproportionate impacts to these populations.

Based on the most recent census data, two additional youth (under 18) individuals and one additional elderly (65 and over) individual reside within the affected area under the proposed MOB 3 mission (Table 4-21). Pursuant to EO 13045, due to age-related physiological differences in types and levels of exposure, the evaluation of environmental impacts to children (youth under 18) is different from the evaluation of environmental impacts to adults (e.g., because children breathe more rapidly than adults and their bodies are not yet fully developed, they have different responses to environmental impacts). Although two additional youth (under 18) individuals and one additional elderly (65 and over) individual would be exposed to additional noise, the resulting impacts would not be considered significant.

Table 4-20. Off-Base Minority and Low-Income Populations in the 65 dB L_{Adn} or Greater ROI (Affected Area), Tinker AFB

Geographic Unit	Percent Minority	Change in Number of Minority Persons from Baseline (Affected Area)	Percent Low-Income	Change in Number of Low-Income Persons from Baseline (Affected Area)
United States	37.2%	N/A	15.6%	N/A
State of Oklahoma	32.2%	N/A	16.9%	N/A
Oklahoma County (COC)	41.6%	N/A	18.5%	N/A
Census Block Group (GEOID) (ROI)				
400272023011	15.4%	No change	7.7%	No change
400272023014	0.0%	No change	0.0%	No change
401091074032	50.0%	+1	0.0%	No change
401091074033	31.6%	No change	21.1%	No change
401091076061	10.8%	No change	32.4%	No change
401091077032	26.3%	No change	18.0%	No change
401091077033	46.2%	No change	4.1%	No change
401091080081	61.1%	No change	28.6%	-1
401091080082	34.4%	No change	16.7%	No change
401091080083	71.1%	+2	31.9%	+3
401091080093	33.3%	+1	0.0%	No change
401091080112	21.1%	No change	26.3%	-1
401091080113	69.4%	-2	35.1%	-2
Total	54.8%	+2	23.5%	-1

Notes: Each census block group is a separate ROI and each separate ROI is compared with the COC to ascertain potential for disproportionate effect. There is no comparison of the Total ROIs to the COC following USAF 2014 EJ guidelines (USAF 2014a).

“+” indicates an increase and “-” indicates a decrease.

Key: N/A = not applicable.

Table 4-21. Off-Base Youth and Elderly Populations in the 65 dB L_{Adn} or Greater ROI (Affected Area), Tinker AFB

Census Block Group (GEOID)	Total Youth	Total Elderly
400272023011	0	0
400272023014	0	0
401091074032	0	0
401091074033	0	0
401091076061	0	0
401091077032	0	0
401091077033	+1	+1
401091080081	-1	0
401091080082	0	0
401091080083	+2	0
401091080093	+1	0
401091080112	0	0
401091080113	-1	0
Total	+2	+1

Note: “+” indicates an increase and “-” indicates a decrease.

Key: Youth = under 18; Elderly = 65 and over.

THIS PAGE INTENTIONALLY LEFT BLANK

4.4 WESTOVER AIR RESERVE BASE

This section of Chapter 4 presents the operational and environmental factors specific to Westover ARB. Sections 2.4.4.2 and 2.4.4.3, respectively, describe the facilities and infrastructure, personnel, and flight operation requirements of the proposed MOB 3 mission and the specific actions at Westover ARB that would be required to implement the mission.

As described in Section 4.5, the No Action Alternative represents complete conversion of the C-5B fleet to the quieter C-5M aircraft. The baseline does not represent the conversion and only represents noise resulting from C-5B aircraft. The No Action Alternative would mean that the proposed KC-46A MOB 3 mission would not be implemented, and no facility or personnel changes would occur at Westover ARB at this time.

4.4.1 Acoustic Environment

In this section, impacts to the acoustic environment associated with proposed flying operations and construction activities are assessed by comparing baseline noise levels to noise levels that would occur with implementation of the proposed MOB 3 mission. The L_{Adn} noise contours resulting from the proposed MOB 3 mission at Westover ARB were generated using the NOISEMAP (Version 7.2) computer model and represent the most current complete set of operational parameters for all ongoing and proposed aircraft operations. KC-46A noise levels are calculated using substitute KC-46A reference noise level data provided by AFCEC. Details of the methodologies used to reach results presented in this section are contained in Volume II, Appendix B, Section B.1.3.

KC-46A aircraft are substantially quieter than the C-5B aircraft operating at Westover ARB under baseline conditions. At a distance of 1,000 feet, KC-46A aircraft are 30 dB quieter than the C-5B aircraft during approach and 18 dB quieter during departure (Table 4-22). Recent progress in turbofan jet engine technology allows dramatic reductions in noise level while still providing sufficient engine thrust. The engines on the KC-46A aircraft incorporate these recent technological advances, while the engines of C-5B aircraft feature older technology.

Table 4-22. Aircraft Noise Level Comparison at Westover ARB

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Landing					
KC-46A	55% N1	74	66	55	44
C-5B	2.85 EPR	104	94	78	65
C-5M	75% N1	86	78	67	57
C-21	70.4% NC	70	62	51	42
C-130	932 CTIT	84	77	66	57
F-16	83.5% NC	86	78	66	56
Business jet (Cessna 500)	305 LBS	64	56	46	37
Single-engine propeller (Cessna 182)	30% RPM	53	46	37	29

Table 4-22. Aircraft Noise Level Comparison at Westover ARB (Continued)

Aircraft	Power Setting	A-Weighted Maximum Noise Level (L _{Amax}) at Overflight Distance (dB)			
		1,000 feet	2,000 feet	5,000 feet	10,000 feet
Takeoff					
KC-46A	92% N1	87	78	65	55
C-5B	92% NF	104	94	79	68
C-5M	95% N1	88	80	69	60
C-21	96% NC	84	76	64	54
C-130	977 CTIT	85	77	66	57
F-16	93% NC	106	98	86	76
Business jet (Cessna 500)	1554 LBS	76	69	58	49
Single-engine propeller (Cessna 182)	100% RPM	70	63	54	46

Note: Aircraft airspeed is 160 knots. Aircraft operate at various airspeeds in and around the airfield; representative F-16 aircraft equipped with Pratt and Whitney F100-PW-229 engine.

Key: Power Units: N1 = engine speed at indicator position 1; NF = fan speed; NC = engine core speed; CTIT = combustion turbine inlet temperature in Celsius; EPR = engine pressure ratio; LBS = pounds of thrust; RPM = revolutions per minute.

Source: NOISEMAP 7.2 Maximum Omega 10 Results; calculated at 59°F and 70 percent relative humidity.

As part of a previously-scheduled program that is not connected to the KC-46A beddown process, all Westover ARB-based C-5B aircraft are being converted to the C-5M model. The conversion is scheduled to be completed by 2019, roughly coinciding with the beginning of the proposed KC-46A operations should Westover ARB be selected for the MOB 3 mission. Therefore, while C-5B operations are a part of baseline conditions, noise level analysis of the proposed MOB 3 mission and No Action Alternative reflects operations of based C-5M aircraft. C-5M aircraft are equipped with new engines; the aircraft are 18 dB quieter than C-5B aircraft during landing and 16 dB quieter during takeoff (Table 4-22). This replacement, which is a separate action from the proposed MOB 3 mission implementation, will result in substantial decreases in overflight noise levels near Westover ARB.

Several types of transient aircraft visit Westover ARB. Some of these aircraft are louder than KC-46A aircraft. KC-46A aircraft would be louder than most of the civilian aircraft collocated at the Westover Metropolitan Airport. These aircraft primarily consist of propeller-driven and small jet aircraft.

KC-46A aircraft are 12 dB quieter than C-5M aircraft on arrival and 1 dB quieter during departure at a distance of 1,000 feet (Table 4-22). In summary, the primary noise-generating aircraft (i.e., the C-5B) will be entirely replaced by an aircraft that is quieter; however, the replacement aircraft (C-5M) is still louder than the KC-46A.

KC-46A aircrews would use the same flight procedures (e.g., ground tracks, altitude profiles) currently used by C-5 aircrews. Tactical flight procedures, which could include steep descents and spiraling departures, are almost entirely practiced in flight simulators by both C-5 and KC-46A aircrews. C-5 aircrews would continue to conduct 8 percent of second approaches as tactical procedures. Approximately 3 percent of all types of KC-46A operations would be tactical.

The 7,032 airfield operations conducted by KC-46A aircrews would be additive to the 17,011 airfield operations currently conducted resulting in a 41 percent increase in total annual operations conducted. Under normal circumstances, KC-46A aircrews would only fly on Tuesdays and Thursdays, mirroring the current C-5 flying schedule.

Flying during acoustic night (10:00 P.M. to 7:00 A.M.) would comprise 5 percent of total KC-46A flying operations. This equates to 352 airfield operations per year during acoustic night, or about two approaches and two departures each night flying occurs (i.e., Tuesdays and Thursdays). Noise generated between 10:00 P.M. and 7:00 A.M. has the potential to be particularly disruptive, and all such noise events are assessed a 10 dB penalty in calculation of the $L_{A_{dn}}$ noise metric.

Noise levels ($L_{A_{dn}}$) resulting from the No Action Alternative, baseline conditions and the proposed MOB 3 mission were calculated using methods described in Volume II, Appendix B, Section B.1.3 (Figure 4-5). As described in Volume II, Appendix B, Section B.1, social surveys have found a correlation between the time-averaged noise level (as measured in $L_{A_{dn}}$) and the percentage of the affected population that is highly annoyed. Sixty-five (65) dB $L_{A_{dn}}$ is the noise level at which a about 13 percent of the population can be expected to be annoyed by noise, and 65 dB $L_{A_{dn}}$ has been adopted by the USAF and several other Federal agencies as the level above which noise-sensitive land uses are not considered compatible. The reaction of an individual to noise cannot be accurately predicted, because the response is subjective and depends on the characteristics of the individual as the circumstances in which the noise event occurs. For example, a person engaged in activities that can be disrupted by noise (e.g., conversation, sleeping, or watching television) is more likely to become annoyed than a person that is not.

As noted previously, differences between baseline conditions and the proposed MOB 3 mission include both the conversion of the C-5B fleet to C-5M aircraft and the addition of KC-46A aircraft operations. The reduction in noise levels associated with the C-5 conversion would negate the increases in noise levels associated with the proposed KC-46A MOB 3 aircraft operations. The net effect of the two changes would be a 396-acre decrease in off-base land exposed to noise levels greater than 65 dB $L_{A_{dn}}$ from 464 acres under baseline conditions to 68 acres under the proposed MOB 3 mission (85 percent decrease). The number of on-base acres affected by noise levels greater than 65 dB $L_{A_{dn}}$ would decrease by 373 (33 percent decrease from 1,139 to 766) (see Table 4-23).

Table 4-23. Acres Exposed to Noise Resulting from the No Action, the Proposed MOB 3 Mission and Baseline Conditions at Westover ARB

Noise Level (dB $L_{A_{dn}}$)	Area (in acres) Exposed to Indicated Noise Levels														
	No Action			Proposed MOB 3 Mission			Baseline			Change (Baseline to No Action)			Change (Baseline to Proposed MOB 3 Mission)		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total	On-Base	Off-Base	Total
65 – 69	252	50	302	260	52	312	320	419	739	-68	-369	-437	-60	-367	-427
70 – 74	201	15	216	200	15	215	369	44	413	-168	-29	-197	-169	-29	-198
75 – 79	149	1	150	162	1	163	208	1	209	-59	0	-59	-46	0	-46
80 – 84	59	0	59	62	0	62	158	0	158	-99	0	-99	-96	0	-96
≥ 85	82	0	82	82	0	82	84	0	84	-2	0	-2	-2	0	-2
Total	742	66	808	766	68	834	1,139	464	1,603	-397 (-35%)	-398 (-86%)	-795 (-50%)	-373 (-33%)	-396 (-85%)	-769 (-48%)

Note: “+” indicates an increase and “-” indicates a decrease.

No off-base residential areas would be affected by noise levels greater than 65 dB $L_{A_{dn}}$, thus no residents would be affected by these noise levels (Table 4-24). The methods used to estimate the affected population are described in Volume II, Appendix B, Section B.1.

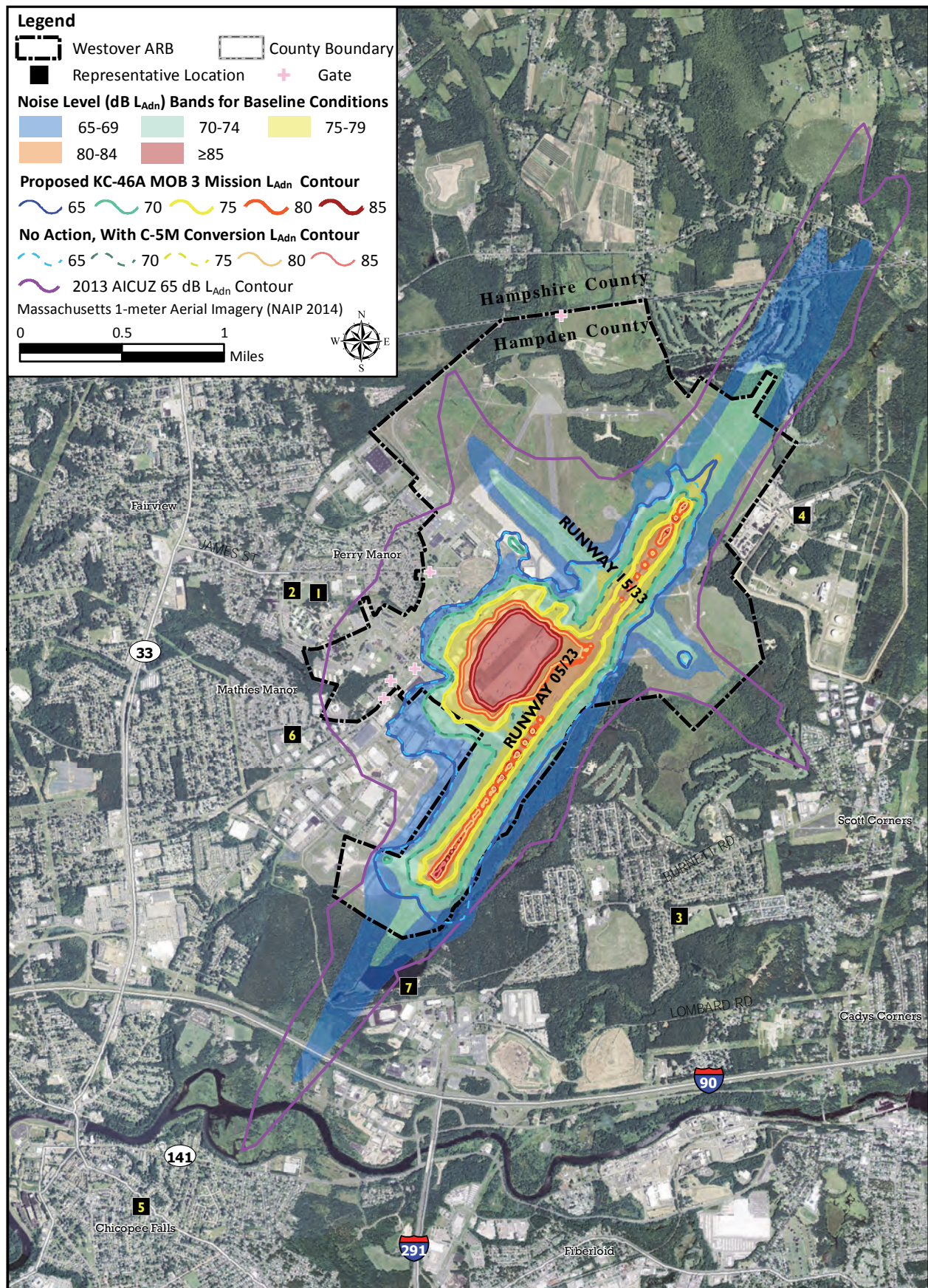


Figure 4-5. No Action, Baseline, and Proposed MOB 3 Mission Noise Contours (dB L_{Adn}) at Westover ARB

Table 4-24. Estimated Off-Base Population Exposed to Noise Resulting from the No Action, Proposed MOB 3 Mission and Baseline Conditions at Westover ARB

Noise Level (dB L _{Adn})	Estimated Off-Base Population Exposed to Indicated Noise Levels				
	No Action	Proposed MOB 3 Mission	Baseline Condition	Change (Baseline to No Action)	Change (Baseline to Proposed MOB 3 Mission)
65 – 69	0	0	38	-38	-38
70 – 74	0	0	0	0	0
75 – 79	0	0	0	0	0
80 – 84	0	0	0	0	0
≥ 85	0	0	0	0	0
Total	0	0	0	-38	-38

Note: “+” indicates an increase and “-” indicates a decrease.

According to current DoD policy, persons exposed to 80 dB L_{Adn} over a very long period, with no barriers to the noise, are at an increased risk of NIPTS, commonly referred to as hearing loss (USD 2009). Noise levels in excess of 80 dB L_{Adn} would not occur at off-base locations. On-base acres affected by noise levels greater than 80 dB L_{Adn} include areas along the flightline. The same 12 flightline buildings affected by noise greater than 80 dB L_{Adn} under baseline conditions would also be affected with implementation of the proposed MOB 3 mission. Hearing loss risk among people working in high-noise environments on Westover ARB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

After conversion of the C-5B to C-5M and implementation of the proposed MOB 3 mission, aircraft noise levels at several representative locations surrounding Westover ARB would decrease 3 to 9 dB L_{Adn} (Table 4-25). Noise levels at all of the locations would remain below 65 dB L_{Adn}.

Table 4-25. Cumulative Aircraft Noise Levels Resulting from the No Action Alternative, the Proposed MOB 3 Mission and Baseline Conditions at Representative Locations Near Westover ARB

Location ID	Location Description	Aircraft Noise Level (dB L _{Adn})				
		No Action	Proposed MOB 3 Mission	Baseline	Change (Baseline to No Action)	Change (Baseline to Proposed MOB 3 Mission)
1	Bowie School	39	42	47	-8	-5
2	Selser School	37	41	46	-9	-5
3	Litwin Elementary	37	37	46	-9	-9
4	Hampden County Sheriff's Department	48	48	55	-7	-7
5	Belcher Elementary	48	48	56	-8	-8
6	Porter and Chester Institute	49	49	52	-3	-3
7	Chicopee Reservoir Beach	55	55	61	-6	-6

Note: “+” indicates an increase and “-” indicates a decrease.

C&D activities in support of the proposed mission would take place in the context of an active USAF base, where aircraft and other types of noise are a normal part of the environment. Construction activities unavoidably generate localized increases in noise qualitatively different from aircraft noise. For example, a typical backhoe, dozer, and crane generate up to approximately 78, 82, and 81 dB, respectively, at a distance of 50 feet (FHWA 2006). Construction noise would be minimized through the use of mufflers and would be temporary and intermittent, lasting only the duration of the

project. Furthermore, construction activities would be expected to occur during normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Although construction noise would not emanate outside of the base boundary, some people working or living on-base near the construction sites may notice and be annoyed by the noise, but noise impacts would not be expected to be considered significant.

Aircraft noise levels ($L_{A_{dn}}$) resulting from the proposed MOB 3 mission at Westover ARB would reflect the concurrent conversion of the C-5B fleet to quieter C-5M aircraft, and resulting noise levels would be less than those resulting from baseline conditions. While the addition of KC-46A operations during acoustic night would be noticed and considered annoying by some people, the decrease that would occur in $L_{A_{dn}}$, associated with combined effects of C-5M conversion and proposed MOB 3 mission implementation, suggests an overall reduction in the percentage of the population that would be highly annoyed by aircraft noise.

4.4.2 Air Quality

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed KC-46A MOB 3 mission at Westover ARB. The estimation of operational emissions that would result from the proposed MOB 3 mission is based on the increase in emissions from the projected KC-46A operations, as the proposed MOB 3 mission would not replace any existing operations at Westover ARB. Volume II, Appendix D, Section D.4.1, of this Draft EIS includes estimations of criteria pollutant emissions, HAPs, and GHGs from proposed sources at Westover ARB.

The immediate area surrounding Westover ARB within Hampden County currently attains all of the NAAQS. Therefore, the analysis used the PSD threshold of 250 tons per year of a pollutant as an indicator of significance of projected air quality impacts within these regions. The northern boundary of the Springfield City maintenance area for CO extends to within about 2 miles of the southern portion of Westover ARB. The proposed MOB 3 mission at Westover ARB would generate commuter vehicle trips from this area. In addition, some KC-46A landings and take-offs and closed pattern operations below 3,000 feet AGL would traverse the northwest portion of this CO maintenance area. Therefore, the analysis also estimated the amount of emissions from these proposed sources that would occur within this area. The analysis used the applicable conformity thresholds for this area (i.e., 100 tons per year of CO) as an indicator of significance. This criterion is being used only to determine if an impact occurs, as the area is in attainment and neither a PSD analysis or conformity determination is required.

Construction – The proposed MOB 3 mission at Westover ARB would require construction and/or renovation of airfield facilities, including training facilities, hangars, taxiways, and maintenance and fueling facilities. Air quality impacts resulting from the proposed construction activities would occur from (1) combustive emissions resulting from the use of fossil fuel-powered equipment and (2) fugitive dust emissions ($PM_{10}/PM_{2.5}$) resulting from the operation of equipment on exposed soil. Construction activity data were developed to estimate proposed construction equipment usages and associated combustive and fugitive dust emissions from the proposed MOB 3 mission.

The air quality analysis assumed that all construction activities for the proposed MOB 3 mission at Westover ARB would begin in 2017 and be completed in 2018.

Factors needed to derive construction source emission rates were obtained from the *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I (USEPA 1995); the USEPA NONROAD2008a model for nonroad construction equipment (USEPA 2009a); and the USEPA MOVES model for on-road vehicles (USEPA 2015b).

Inclusion of standard construction practices and LEED Silver certification into proposed construction activities would potentially reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels. Section 4.1.2 describes standard construction practices that would control fugitive dust.

Operations – Sources associated with operation of the proposed MOB 3 mission at Westover ARB would include (1) KC-46A aircraft operations and engine maintenance/testing, (2) AGE, (3) onsite GMVs and POVs, (4) offsite commuting of POVs, (5) mobile fuel transfer operations, and (6) stationary and area sources. Operational data used to calculate projected KC-46A aircraft emissions were obtained from data used in the project acoustic environment analyses (see Section 4.4.1). Emissions from on-wing testing of KC-46A aircraft engines are based on a per-aircraft basis for maintenance activities proposed for the KC-46A MOB 1 mission at Fairchild AFB (AFCEC 2014a). Factors used to calculate combustive emissions for the KC-46A aircraft were based on emissions data developed by Pratt and Whitney for the PW4062 engine (ICAO 2013b). The operational times in mode for the KC-46A engine were based on those currently used for the KC-135 aircraft (AFCEC 2014b).

Emissions from non-aircraft sources that would be generated by the proposed MOB 3 mission were estimated by the following methods:

1. To estimate emissions from the usage of AGE by KC-46A aircraft, the analysis assumed that the annual AGE usage of one KC-46A aircraft would equate to the annual AGE usage of one KC-135 aircraft, as inventoried at Seymour Johnson AFB in 2014 (Zapata Inc. and URS Group, Inc. 2015).
2. Emissions from POVs and GMVs were estimated by multiplying existing emissions generated at Westover ARB from these sources by the base employment population for the proposed MOB 3 mission, then dividing this product by the total existing base employment population.
3. Emissions from stationary and area sources were estimated by multiplying existing emissions generated at Westover ARB from these sources by the number of proposed KC-46A landings and take-offs, then dividing this product by the total existing base landings and take-offs.

The air quality analysis assumed that the proposed MOB 3 mission would reach full operations and resulting emissions in 2019, after the completion of all construction activities required for the MOB 3 beddown. These estimates represent the peak year of operational emissions, as the project AGE, POV, and GMV fleets would gradually turnover in the future to newer equipment and vehicles with cleaner USEPA emission standards. The analysis also used 2015 (the most recent year of operational activities) to define existing emissions for Westover ARB (see Table 3-42).

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest 3,000 feet of the atmosphere, as this is the typical depth of the atmospheric mixing layer, where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality.

4.4.2.1 Air Quality Consequences

Table 4-26 presents estimates of emissions that would occur from infrastructure changes (see Table 2-15) for the MOB 3 mission at Westover ARB. The analysis conservatively assumes that all construction activities and resulting emissions would occur in one year. These data show

that total construction emissions would be well below the PSD thresholds. Therefore, temporary construction emissions associated with the proposed MOB 3 mission would not result in significant air quality impacts.

Table 4-26. Total Construction Emissions for the Proposed MOB 3 Mission at Westover ARB

Construction Activity	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
Demolition	0.04	0.14	0.37	0.00	0.48	0.07	103
Building Construction/Renovations	1.14	5.97	8.29	0.01	7.00	1.46	1,627
Parking Ramp Taxi Lane – Remove Asphalt	0.08	0.32	1.02	0.00	0.23	0.06	184
Parking Ramp Taxi Lane Repair – Pour Concrete	0.07	2.42	0.40	0.00	0.24	0.04	109
Parking Ramp Taxi Lane – Re-Stripe	0.31	1.74	2.23	0.00	2.19	0.44	388
POV Parking for 2-Bay Hanger – Asphalt	0.00	0.02	0.04	0.00	0.08	0.01	11
Total Emissions	1.65	10.60	12.35	0.02	10.22	2.08	2,422
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO₂e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Table 4-27 summarizes the annual operational emissions within Hampden County that would result from implementation of the proposed MOB 3 mission at Westover ARB. These data show that the increase in emissions from the addition of 12 KC-46A aircraft would not exceed 250 tons per year for VOCs, CO, SO_x, PM₁₀, or PM_{2.5}. In addition, these emission increases would amount to no more than 1 percent of any total criteria pollutant generated within Hampden County in 2011 (see Table 3-41). Therefore, implementing the proposed MOB 3 mission at Westover ARB would not produce significant impacts to these pollutant levels. However, these data also show that the increase in NO_x emissions would exceed 250 tons per year. KC-46A aircraft operations and on-wing engine testing activities would be the primary contributors to these emission increases.

Table 4-27. Annual Operations Emissions from the Proposed MOB 3 Mission at Westover ARB, 2019

Activity Type	Air Pollutant Emissions (tons per year)						
	VOCs	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (mt)
KC 46A Aircraft Operations	12.09	53.51	329.07	17.21	1.07	0.91	47,749
On-Wing Aircraft Engine Testing – KC-46A	1.57	39.71	18.73	1.68	0.16	0.14	4,500
AGE	0.02	0.11	0.11	0.00	0.02	0.01	26
GMVs	0.04	0.58	0.68	0.00	0.08	0.03	328
POVs – On Base	0.01	0.39	0.03	0.00	0.01	0.00	43
POVs – Off Base	0.08	6.56	0.55	0.00	0.07	0.02	667
Point and Area Sources	0.57	1.45	2.15	0.03	0.17	0.14	2,019
Total Proposed MOB 3 Mission Emissions	24.38	102.32	351.32	18.92	1.58	1.26	55,332
Operational Emissions Increase Fraction of Hampden County Emissions	0.002	0.002	0.034	0.01	0.0001	0.0004	0.03
PSD Threshold	250	250	250	250	250	250	N/A

Key: CO₂e (mt) = carbon dioxide equivalent in metric tons; N/A = not applicable.

Emissions of NO_x resulting from implementation of the MOB 3 mission within Hampden County were compared to the most recent Hampden County emissions inventory (2011) to determine the relative magnitude of these emissions and their potential to combine with baseline emissions and contribute to an exceedance of an ambient air quality standard. The NO_x emission increases that would result from the proposed KC-46A operations would amount to approximately 4 percent of the total NO_x emissions generated by Hampden County in 2011 (see Table 3-41). The overwhelming majority of NO_x emissions that would result from the proposed MOB 3 mission would occur from intermittent KC-46A aircraft operations up to an altitude of 3,000 feet AGL and across several square miles that comprise the Westover ARB airspace and adjoining aircraft flight patterns. These emissions would be adequately dispersed through this volume of atmosphere to the point that they would not be expected to result in substantial ground-level impacts in a localized area. Given that Hampden County attains all of the NAAQS, these NO_x emission increases would likely not be substantial enough to contribute to a NAAQS exceedance. Therefore, the proposed MOB 3 mission at Westover ARB would not produce significant air quality impacts.

Because the Springfield City CO maintenance area is adjacent to Westover ARB, the following evaluates the potential for operations of the proposed MOB 3 mission to increase CO emissions within this area. Proposed sources that would operate within this area would include project commuter traffic and KC-46A aircraft during landings and take-offs and closed pattern operations below 3,000 feet AGL. Only a portion of the project personnel that would work at Westover ARB and reservists would commute through the Springfield City CO maintenance area, as many of them would live west and north of this area. To be conservative, it was assumed that 50 percent of the total project commuting activities would occur within the Springfield City CO maintenance area, which would generate 3.28 tons per year of CO emissions within this area. Review of the KC-46A flight profiles determined that approximately 6.3 percent of the total annual landings and take-offs and 2.1 percent of closed pattern operations are below 3,000 feet AGL within the Springfield City CO maintenance area. The associated emissions due to these operations would amount to a total of 0.40 tons per year of CO. Therefore, the analysis estimates that the total CO emissions generated by the MOB 3 mission at Westover ARB within the Springfield City CO maintenance area would equate to 3.68 tons per year. This increase in CO emissions would remain well below the applicable conformity threshold of 100 tons per year for CO. As a result, the proposed MOB 3 mission at Westover ARB would not produce significant CO impacts within the Springfield City CO maintenance area.

Operation of the proposed MOB 3 mission at Westover ARB would emit HAPs that could potentially impact public health. Proposed KC-46A aircraft operations and on-wing engine testing activities would generate the majority of HAPs. As described for proposed NO_x impacts, since proposed KC-46A operations would occur intermittently over a large volume of atmosphere, they would be expected to produce minimal ambient impacts of HAPs in a localized area.

Early in planning, the USAF reconsidered operational assumptions and projections to avoid or reduce potential impacts to the extent feasible. This resulted in the development of alternatives that reduced the emissions of criteria pollutants to the extent feasible by reducing the number of near-field operations (e.g., landings and take-offs). At this time, the USAF is not aware of any other feasible mitigations that could be applied to further reduce the emissions impact from KC-46A aircraft operations and on-wing engine testing activities.

4.4.2.2 *Climate Change Effects*

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-26 shows that construction for the proposed MOB 3 mission at Westover ARB would produce a total of 2,422 metric tons of CO₂e emissions. Table 4-27 shows that operation of the proposed MOB 3 mission at Westover ARB would result in an increase of 55,332 metric tons per year of CO₂e emissions.

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed MOB 3 mission at Westover ARB, the following considers how climate change may impact proposed operations at Westover ARB. For Westover ARB, the projected climate change impact of concern is increased temperatures, as documented in *Climate Change Impacts in the United States – The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Northeast region surrounding Westover ARB will experience warmer temperatures and an increase in precipitation, particularly heavier rainfall events. One of the main outcomes of these conditions will be increased flooding in the region, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure. Warmer temperatures will also increase heat wave intensity and frequency, increase humidity, degrade air quality, and reduce water quality, resulting in an increase in public health risks.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EOs and the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013b) and the U.S. Air Force Energy Strategic Plan (USAF 2013c). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects within their jurisdiction, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

4.4.3 **Safety**

This section addresses the potential environmental consequences to flight and ground safety that could occur at or in the vicinity of Westover ARB with implementation of the proposed KC-46A MOB 3 mission. The addition of 12 aircraft associated with the MOB 3 mission would cause an increase in airfield operations and could increase both flight and ground safety risk.

The MOB 3 mission would be a new mission at Westover ARB, resulting in additional, new aircraft operations, which could increase safety consequences.

4.4.3.1 *Flight Safety*

Aircraft Mishaps – Although there would be an increase in operations with the addition of the MOB 3 mission, KC-46A aircraft would utilize similar flight patterns as those used by the C-5B mission on approach and departure. As described in Section 4.1.3, the Class A accident rate for the KC-46A is expected to be similar to that of the commercial airframe upon which it is based (B-767). Using the accident rate of 0.43 per flight cycle, the probability of a KC-46A Class A accident in the vicinity of the airfield is projected at less than one every 100 years (see Volume II, Appendix B, Section B.3.3.1).

Implementation of the KC-46A MOB 3 mission at Westover ARB is not anticipated to result in any net increase in the safety risks associated with aircraft mishaps or any increase in the risks of occurrence of those mishaps.

Bird/Wildlife-Aircraft Strike Hazard – The addition of 12 aircraft could slightly increase the risk of aircraft accidents due to bird/wildlife-aircraft strikes. Ongoing elements of the Westover ARB BASH Plan would continue (Westover ARB 2014b).

Westover ARB uses the same BASH principles described in Section 4.1.3.1 to reduce bird/wildlife-aircraft strike risks. No significant impacts are anticipated related to BASH issues.

4.4.3.2 Ground Safety

No aspects of the proposed KC-46A MOB 3 mission at Westover ARB are expected to create new or unique ground safety issues not already addressed by current policies and procedures. O&M procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

No unique construction practices or materials would be required as part of any of the renovation, addition, or construction projects associated with the proposed KC-46A MOB 3 mission at Westover ARB. All renovation and construction activities would comply with all applicable OSHA regulations to protect workers. In addition, the newly constructed buildings would be built in compliance with antiterrorism/force protection requirements (DoD 2013). The USAF does not anticipate any significant safety impacts as a result of construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

KC-46A operations would occur in an airfield environment similar to the current operational environment. Because the KC-46A is a new airframe and would require response actions specific to the aircraft, the emergency and mishap response plans would be updated to include procedures and response actions necessary to address a mishap involving the KC-46A and associated equipment. With this update, the Westover ARB airfield safety conditions would still be similar to baseline conditions. Therefore, no significant impact would occur from aircraft mishaps or mishap response.

4.4.4 Soils and Water

4.4.4.1 Soil Resources

All of the C&D activities associated with the proposed KC-46A MOB 3 mission would occur on previously disturbed areas within the boundary of Westover ARB. As shown in Table 2-15, the disturbed area for the new construction projects proposed as part of the KC-46A MOB 3 mission would be less than 12 acres (new construction).

Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling.

For any projects that result in soil disturbance, the Government construction management entity would ensure that all construction activities are conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. The *Westover ARB Storm Water Pollution Prevention Plan (SWPPP)* (Westover ARB 2015f) references the USEPA control measures that are generally

used to reduce the potential for soil erosion and sediment transport offsite. Significant impacts to soil resources would not result from implementation of the proposed MOB 3 mission.

4.4.4.2 Water Resources

Prior to construction activities, Westover ARB and the design or construction contractor would submit an NOI under the NPDES procedures as described in the USEPA Construction General Permit. Per the Construction General Permit, the construction contractor would prepare a site-specific SWPPP describing site-specific measures that would be implemented prior to construction. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements.

Less than 12 acres of impervious surface would be added to the existing 598 acres of impervious surface on the installation (Westover ARB 2015f). Although this additional impervious surface would increase sheet flow and stormwater runoff, the total impervious surface on base would increase by less than 1 percent. The increase in impervious surface would not result in long-term adverse impacts to water resources.

For any projects that result in soil disturbance, the USAF would ensure that all construction activities are conducted in accordance with applicable stormwater discharge permit requirements. The proposed construction could result in localized increases in stormwater runoff volume and intensity, in addition to increases in total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10, LID (as amended, 2016) and the EISA Section 438 (42 USC §17094), any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features. The integration of LID design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas and use of detention basins to release runoff over time.

In 2015, the base used approximately 76,000 gallons of aircraft deicing fluid. The MSGP has an upper effluent limit of 100,000 gallons of aircraft deicing fluid on an average annual basis before additional monitoring and reporting are required.

Aircraft deicing operations for the proposed MOB 3 mission would primarily occur on the East Ramp. The increase in flying operations resulting from implementation of the proposed KC-46A MOB 3 mission at Westover ARB would have the potential to increase the use of aircraft deicing fluids, thereby potentially increasing the amount of deicing fluid in stormwater runoff. Primary recovery of spent deicing fluid would be conducted with a vacuum truck. Once recovered, the spent deicing fluid would be transferred to a holding tank for recycling or proper disposal. Remaining deicing fluid from the ramp would be primarily discharged through Outfall 1, where it is partially bioremediated in a submerged flow constructed wetland before discharging to Cooley Brook.

If implementation of the proposed MOB 3 mission at Westover ARB would require the use of more than 100,000 gallons of deicing fluid on an average annual basis, quarterly benchmark water quality monitoring at Outfall 1 would be required to validate compliance the benchmark monitoring concentrations contained in Table 8.S-1 in Part 8, Sector S of the MSGP. The quarterly results would be reported to the USEPA. If the sample results exceed the benchmark levels for Biological Oxygen Demand (BOD) [30 milligrams per liter (mg/L)], Chemical Oxygen Demand (COD) (120 mg/L), Ammonia (2.14 mg/L) or pH (6-9), additional controls would require evaluation and possible implementation. Because the nature of the activity (aircraft deicing) is not changing, a change to the permit would not be required. Although increases in aircraft operations could increase the amount of deicing fluid utilized, long-term significant adverse impacts to water quality are not anticipated to result from deicing operations associated with the proposed KC-46A MOB 3 mission at Westover ARB.

4.4.4.3 Floodplains

Based on the results of the GIS analysis as described in Section 3.4.4.2.3 to identify the 100-year floodplain plus 3 feet elevation, no floodplains are near the 439 Airlift Wing (AW) ramp, where all of the construction, demolition and renovation is proposed to occur. Therefore, significant impacts to floodplains would not result from implementation of the proposed MOB 3 mission at Westover ARB.

4.4.5 Biological Resources

4.4.5.1 Vegetation

Activities associated with the construction, demolition, and renovation projects would occur in previously disturbed areas and would only affect small areas of improved lands. These areas are already disturbed for ongoing, routine maintenance and/or landscaping activities and are of low ecological value. Therefore, no impacts to vegetation are anticipated to result from implementation of the MOB 3 mission at Westover ARB.

4.4.5.2 Wildlife

Potential impacts to wildlife could include habitat alteration and disturbance resulting from both construction and aircraft noise. In addition, airfield operations can result in bird/wildlife-aircraft strikes. The areas planned for development as part of the proposed MOB 3 mission are in previously disturbed areas of improved lands on Westover ARB and provide little wildlife habitat. Therefore, the proposed MOB 3 mission would not result in significant impacts to local wildlife populations.

Airfield operations are anticipated to increase at Westover ARB. Much of the area that would be subject to increased noise levels consists of developed or residential land use. Increased operations would increase the potential for bird/wildlife-aircraft strikes. However, continued adherence to the base's BASH Plan would minimize the risk (Westover ARB 2014b).

The combination of the C-5B conversion with implementation of the proposed MOB 3 mission would result in a decrease of off-base acres affected by noise associated with aircraft operations (see Section 4.4.1.1).

Noise resulting from the proposed construction would be localized, short-term and only during daylight hours. Wildlife in the areas proposed for construction and near the airfield is already exposed to aircraft noise under baseline conditions. Therefore, no impacts to wildlife are anticipated from the implementation of the proposed MOB 3 mission at Westover ARB.

4.4.5.3 *Special-Status Species*

No federally listed species or designated critical habitat occurs at Westover ARB. Therefore, no impacts to federally listed species are anticipated to result from implementation of the proposed MOB 3 mission at Westover ARB. The USFWS has concurred with this determination (see letter dated 30 June 2016, Volume II, Appendix A, Section A.6.4.2).

All of the projects would occur in developed or disturbed areas within the improved grounds on base. The proposed construction, demolition and renovation would not occur in any of the areas on base that provide habitat for special-status species. Therefore, no impacts to special-status species are anticipated.

4.4.5.4 *Wetlands*

Because no wetlands occur within the areas proposed for development, no impacts to wetlands are anticipated to result from implementation of the proposed MOB 3 mission at Westover ARB.

4.4.6 **Cultural Resources**

Implementation of the proposed KC-46A MOB 3 mission at Westover ARB would include renovation/construction of six facilities: 2-bay hangar, flight simulators/squadron operations building, fuselage trainer, civil engineering grounds facility, relocated gas station, and expansion of the existing fitness center (Building 1700). Construction of the new facilities would require demolition of Hangar 7071 and Buildings 2426, 7045, and 7046. Renovation projects would occur along the parking ramp taxi lane, and to the interior of Hangars 7072 and 7073 and Buildings 5103, 5375, and 5377.

On 29 March 2016, pursuant to Section 106 (54 *USC*. 306108) of the NHPA, Westover ARB submitted a letter to the Massachusetts Historical Commission (MHC) regarding the proposed KC-46A MOB 3 mission at Westover ARB. Westover ARB requested concurrence from the MHC that no historic properties would be affected by the proposed undertaking (Volume II, Appendix A, Section A.5.4). On 28 April 2016, the MHC responded by letter and identified that the Westover ARB area (Historic District, MHC# CH1AA) is included in the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth.

On 4 August 2016, Westover ARB submitted a response letter to the MHC identifying the APE which includes the Historic District. This letter stated that the proposed undertaking includes the demolition of Hangar 7071 and Building 2426, contributing resources to the Historic District, and will therefore result in an adverse effect on the historic property. Pursuant to 36 *CFR* § 800.6(c), the letter also stated that the USAF was seeking concurrence from MHC on the adverse effect determination and will continue to consult with the MHC in order to avoid, minimize, or mitigate the potential adverse effects of the undertaking. In a response dated 26 August 2016, the MHC concurred with the USAF letter (see Volume II, Appendix A, Section A.5.4.1).

Although the proposed demolition, renovation, and new construction for the proposed MOB 3 beddown would occur in a limited area of the current Westover ARB boundaries, the undertaking has the potential to directly and indirectly affect the NRHP-eligible Historic District, including portions of the Historic District that may lie beyond the current installation boundary. Individual contributing resources that would be affected by the proposed undertaking, should it occur at Westover ARB, include Hangars 7071, 7072 and 7073, and Buildings 2426, 5103, 5375 and 1700. The remaining buildings and structures (including Buildings 7045, 7046, 5377, and

the parking ramp) were constructed after the period of significance and are not contributing resources to the Historic District.

The USAF has determined that the proposed undertaking will have an adverse effect on historic properties, in particular Hangar 7071 (built in 1941) and Building 2426 (an avionics shop built in 1960), both contributing elements to the Historic District. The USAF initial site survey report for the potential beddown of the KC-46A MOB 3 aircraft at Westover ARB identified that the only three-bay hangars that could house the KC-46A are currently and will continue to be devoted to C-5 flying and Regional Isochronal (RISO) operations. The remaining five hangars at Westover ARB were considered not adequately sized and, due to deteriorating conditions, could not be renovated to house the KC-46A aircraft. Therefore, the beddown would require construction of a new two-bay hangar in place of Hangar 7071 and Building 2426.

Hangar 7071 is one of four similar hangars (7072, 7073, 7075) constructed in 1941 in the Art Moderne style. As part of the proposed undertaking, Hangars 7072 and 7073, and Buildings 5103 (a dormitory built in 1957) and 5375 (a base supply and equipment warehouse built in 1956), all contributing resources to the Historic District, would require interior renovation to accommodate the proposed KC-46A MOB 3 mission. If Westover ARB is selected for the MOB 3 mission, the USAF has agreed to complete the interior renovation of Hangars 7072 and 7073 and Buildings 5103 and 5375 per the Secretary of Interior's Standards for the Treatment of Historic Properties (Secretary of Interior [SOI] Standards, 36 *CFR* Part 68) as part of the proposed undertaking, thereby avoiding adverse effects to these contributing resources.

In addition to the construction of a new two-bay hangar, the proposed undertaking also entails the construction of new facilities and the expansion of Building 1700 (a gymnasium built in 1949). As the proposed new facilities would further the key USAF mission at Westover ARB, and the USAF proposes to design the facilities per SOI Standards, the new construction would have no adverse effect on historic properties. The proposed undertaking would also allow Building 1700 to continue to be used as a fitness center. Building 1700 has been substantially expanded since its original construction; therefore, all new additions constructed as part of this undertaking would be designed in accordance with the SOI Standards so as to not diminish the historic character of the building or the Historic District.

Should the proposed MOB 3 mission be located at Westover ARB, the USAF has agreed, in consultation with the MHC, to prepare Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) recordation of Hangar 7071 and Building 2426. Westover ARB has also agreed to continue consulting with the MHC in order to identify the boundaries of the Westover ARB Historic District and the contributing resources within it. In addition, the MHC has agreed to participate in the design review process for the associated new construction.

Although known archaeological sites and sensitive areas have been identified within the boundaries of Westover ARB, there is a low potential for intact archaeological resources to occur within the APE. The archaeological sites and sensitive areas are located beyond the APE for anticipated ground disturbance. Although there may have been prehistoric and historic occupation of the installation at one time, the landscape within the APE was significantly modified during the construction of the airfield. Because all ground-disturbing activities would occur in previously disturbed contexts, it is unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with 36 *CFR* § 800.13.

As required by Sections 101(d)(6)(B) (54 *USC* 302706) and 106 (54 *USC* 306108) of the NHPA, implementing regulations at 36 *CFR* § 800.2(c)(2), EO 13175, DoDI 4710.02, and AFI 90-2002, Westover ARB is consulting with five tribes on a government-to-government basis to identify any traditional cultural properties that may be present on the base. The consultation correspondence includes an invitation to participate in the Section 106 and NEPA processes, and an invitation to consult directly with the Westover ARB Base Commander regarding any comments, concerns, or suggestions (Volume II, Appendix A, Section A.3, letter dated 1 April 2016).

Table A-1 in Volume II, Appendix A, Section A.3, contains a record of tribal consultation up to the publication of this document. No concerns regarding traditional cultural properties, properties of traditional religious or cultural importance, or other cultural concerns have been received. Westover ARB has completed tribal consultation for the proposed KC-46A MOB 3 mission.

4.4.7 Land Use

4.4.7.1 Physical Development

The physical development associated with the proposed KC-46A MOB 3 mission at Westover ARB would occur within the Flightline District, Historic Core District, and Mission Support District. The proposed physical development projects in the Flightline District would not change the existing land uses, which are airfield pavement and aircraft O&M. Likewise, the construction of the Flight Simulators/Squadron Operations facility and Fitness Center expansion in the Historic Core District would also not substantially change the existing land uses, which are categorized as administrative and community/commercial. Construction of the Civil Engineering Grounds Facility in the Mission Support District would occupy 7,503 square feet of open space.

Overall, the physical development proposed to support the proposed KC-46A MOB 3 mission at Westover ARB would not result in changes to the existing land uses on the base. Subsequent O&M activities associated with the MOB 3 mission would conform to current and future land uses on the base. The physical changes and daily activities on the ground would be confined to Westover ARB. Implementation of the proposed projects on Westover ARB would have no impacts to off-base land use.

4.4.7.2 Aircraft Operations

This analysis includes an evaluation of the potential noise impacts to on- and off-base land uses resulting from the proposed KC-46A MOB 3 mission at Westover ARB. Volume II, Appendix C, Section C.1.3.2, presents the noise compatibility guidelines for noise exposure to various land uses.

No additional on- or off-base land would be exposed to noise levels greater than 65 dB L_{Adn} with implementation of the proposed MOB 3 mission at Westover ARB (Table 4-23). Noise generated by KC-46A aircraft associated with the proposed MOB 3 mission would not be louder than the baseline noise at Westover ARB. As described in Section 4.4.1.1, the C-5B model aircraft currently stationed at Westover ARB are being replaced with the quieter C-5M models. This conversion is expected to be completed in 2019. No land use impacts on or off base would result from implementation of the proposed KC-46A MOB 3 mission.

It is anticipated that Westover ARB would continue to incorporate AICUZ policies and guidelines into zoning ordinances and comprehensive plans of the cities of Chicopee and Springfield, and the Towns of Granby and South Hadley. The Town of Ludlow has successfully implemented an Aircraft Flight Overlay Zoning District that includes zoning restrictions in the Westover ARB APZs and CZs within its jurisdiction.

4.4.8 Infrastructure

Refer to Section 3.4.8 for a description of existing infrastructure system capacities and conditions at Westover ARB. Table 2-16 provides changes in population that would result from implementation of the proposed MOB 3 mission at Westover ARB. These projected changes in population and development were used to determine the impact on infrastructure. The maximum demand or impact on capacity was calculated for the potable water, wastewater, electric, and natural gas systems based on the projected change in population. To identify maximum demand or impact on these systems, any change in population was assumed to reside on base. For the assessment of the transportation infrastructure, any change in population was assumed to reside off base.

4.4.8.1 Potable Water System

Based on the average, per person usage rate of 125 GPD (UFC 3-230-03), it is anticipated that the proposed MOB 3 population change would create an additional water use demand of 0.1 MGD (125 GPD x 1,055). This equates to an increase of 76 percent over the current demand of 0.13 MGD at Westover ARB. Use of the 125 GPD per person rate of is a conservative measure of water use, as those numbers reflect the average residential use which includes showering, laundry, and other non-drinking uses of water. This increase would represent less than 0.1 of 1 percent of the 200 MGD supplied to Westover ARB and surrounding communities by the Massachusetts Water Resources Authority and impacts would be less than significant.

4.4.8.2 Wastewater

The USEPA estimates that the average person generates approximately 120 GPD of wastewater between showering, toilet use, and general water use (USEPA 2014). Using this rate the proposed increase in population would increase wastewater discharge from Westover ARB by 0.1 MGD (120 GPD x 1,055). This increase, combined with the existing daily discharge would not exceed the 15.5 MGD water capacity of the City of Chicopee's system and impacts would be less than significant.

4.4.8.3 Stormwater System

The majority of this work would occur on previously disturbed areas. Table 2-17 identifies the projects associated with the proposed MOB 3 mission. The total potential disturbed area associated with these projects would not exceed 12 acres (the area for new construction), and impacts would be less than significant. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction; constructing retention facilities; and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures.

During the short-term construction period for the proposed MOB 3 mission, the construction contractor would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management during construction. Additional stormwater requirements are described in Section 3.4.4.

4.4.8.4 Electrical System

The USEIA estimates that the average household in Massachusetts uses 0.615 MWh per month (USEIA 2014). Converting this rate to an hourly rate and assuming 411 new households (i.e. one

new household for each new authorized personnel on base), the proposed increase in population would increase electrical use by 0.02 MW. In 2014, Westover ARB used an average of 2.3 MW. The increase in population associated with the proposed MOB 3 mission would result in a 0.01 percent increase in electric use at Westover ARB and impacts would be less than significant.

4.4.8.5 Natural Gas System

The USEIA estimates that the average person in Massachusetts uses 18.8 Mcf of natural gas per year (USEIA 2016). Using this rate, the proposed increase in population (1,055) would increase natural gas use by Westover ARB by 2.3 Mcf per hour or 20,148 Mcf per year. This a small fraction of the 128 MMcf used by the population of Westover ARB in 2014 and impacts would be less than significant.

4.4.8.6 Solid Waste Management

For the proposed MOB 3 mission, it is estimated that 14,350 tons of C&D debris would require management. The DoD has set a target diversion rate of 60 percent of C&D debris to be reused or recycled. Application of the 60 percent target diversion rate would result in 8,610 tons being reused or recycled and 5,740 tons being transported to the F&G Transfer Station near East Windsor, Connecticut, and transferred to landfills located outside the state. Additional personnel and dependents associated with the proposed MOB 3 mission would generate additional solid waste. None of the waste generated as part of the proposed MOB 3 mission is anticipated to have significant impacts.

Contractors would be required to comply with Federal, state, and local regulations for the collection and disposal of MSW from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFI 32-7042, "Waste Management."

4.4.8.7 Transportation

Implementation of the facilities and infrastructure projects associated with the proposed MOB 3 mission at Westover ARB would require the delivery of materials to and removal of construction-related debris from demolition, renovation, and new construction sites. Trucks associated with these activities, along with construction crews, would access the base via the James Street Gate or the Industrial Drive Gate. Construction-related traffic would comprise only a small portion of the total existing traffic volume in the area and at the base. Increased traffic associated with C&D activities could contribute to increased congestion at the entry gates, delays in the processing of access passes, and degradation of the affected road surfaces.

Intermittent traffic delays and temporary road closures could occur in the immediate vicinity of the facility and infrastructure project sites. Potential congestion impacts could be avoided or minimized by scheduling truck deliveries outside of the peak inbound traffic time. Also, many of the heavy construction vehicles would be driven to the site and kept on base for the duration of the C&D activities, resulting in relatively few additional trips. Traffic delays would be temporary in nature, ending once construction activities have ceased. As a result, no long-term or significant impacts on transportation infrastructure are anticipated.

Implementation of the proposed MOB 3 mission at Westover ARB would result in an increase of 411 on-base mission personnel (full-time military, DoD civilians, other base personnel), which would equate to approximately a 20 percent increase in daily commuting traffic to and from the

base. In addition to the increase in personnel-related traffic, there would also be an increase in dependent and commercial traffic. In order to provide a more conservative estimate and evaluate the greatest potential for impacts, it was assumed that all personnel and dependents live off base, work standard workdays, and drive individually to the base. The small increase in base mission personnel could increase congestion and queuing at the Main Gate during morning and evening rush hours. To minimize this, the base could adjust the schedule of operations to accommodate this increase and/or provide additional personnel at the gate to process security checks during peak hours. Regional access roads and the on-base road network have adequate capacity to absorb the small amount of additional traffic without major impacts on traffic flow, circulation, or level of service.

No significant impacts to infrastructure are anticipated to result from implementation of the proposed MOB 3 mission.

4.4.9 Hazardous Materials and Waste

4.4.9.1 Hazardous Materials Management

Section 4.1.9.1 describes the hazardous materials management specific to the KC-46A aircraft. Implementation of the proposed KC-46A MOB 3 mission at Westover ARB is not anticipated to add any new hazardous materials that exceed the base's current hazardous waste processes. Existing procedures for the centralized management of the procurement, handling, storage, and issuance of hazardous materials through the base HAZMART are adequate to accommodate the changes anticipated with the addition of the KC-46A MOB 3 mission, but would be expanded to meet the increased use.

4.4.9.1.1 Aboveground and Underground Storage Tanks

The addition of 12 KC-46A aircraft at Westover ARB is expected to increase the maximum daily consumption of Jet-A. The increase in fuel consumption would be supported by the current infrastructure.

New and remodeled facilities would require the addition of ASTs for generators and hazardous materials and hazardous waste containers. The new and remodeled facilities would be constructed with berms and drains leading to OWSs, if required, to contain potential uncontrolled releases of petroleum products. The proposed MOB 3 mission would require the demolition of the AGE gas station (Buildings 7045 and 7046) to clear space for the construction of the new hangar. Three underground storage tanks (USTs) (7045-A, 7045-B, and 7045-C) are associated with these facilities and would be removed. The new AGE gas station would require new USTs and/or ASTs. Building 7071 would also require demolition to clear space for the new hangar. One OWS (OWS 7071) associated with Building 7071 would also be removed. The *Hazardous Material Emergency Planning and Response Plan* for Westover ARB would be amended to capture any changes in facility design, construction, operation, or maintenance that materially affect the potential for an uncontrolled release of petroleum products (Westover ARB 2011).

4.4.9.1.2 Toxic Substances

Several demolition and renovation projects are planned as part of the proposed KC-46A MOB 3 mission at Westover ARB. Any renovation, construction, or demolition project proposed at Westover ARB would be reviewed to determine if ACM is present. Building 2426 is known to contain ACM. Volume II, Appendix F, Table F-4, contains a list of the eight additional buildings proposed for modification and their potential to contain ACM. Additional testing would be

conducted where no data exist. All testing and data collection would be conducted in accordance with the Asbestos Management Plan (Westover ARB 2013a). Any exposed friable asbestos would be removed in accordance with USAF policy and applicable health laws, regulations, and standards. Advanced written notification (Form BWP AQ 04 [ANF-001]) to the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Waste Prevention and the USEPA are required for all anticipated asbestos abatement activity, as required by 40 *CFR* 61.145 and Massachusetts Regulations 310 CMR 4.00, 310 CMR 7.00, 7.09, 7.15, and 453 CMR 6.00. (Westover ARB 2013a). The handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

All renovation, construction, or demolition projects proposed at Westover ARB would be reviewed to determine if LBP is present, and whether such materials would be disturbed in the performance of the work. Volume II, Appendix F, Table F-4, contains a list of the nine buildings that would be affected by demolition or renovation, the years of construction, and the potential for LBP. In accordance with the LBP Management Plan (Westover ARB 2013b), any required renovation or demolition activities (e.g., sanding, scraping, or other disturbances of the paint) that could generate lead dust would not be performed without prior LBP testing. All handling and disposal of wastes would be conducted in compliance with Federal and state regulations.

Although minor increases in the management requirements for ACM and LBP removal are anticipated, no adverse impacts are anticipated to result from implementation of the proposed KC-46A MOB 3 mission at Westover ARB. Long-term environmental benefits from removal of toxic substances are anticipated.

4.4.9.2 Hazardous Waste Management

Westover ARB would continue to be classified as an LQG and generate hazardous wastes during various O&M activities. Hazardous waste disposal procedures, including off-base disposal procedures, are adequate to handle changes in quantity and would remain the same. Hazardous waste anticipated to be generated by the proposed KC-46A MOB 3 mission would be similar to waste generated by the existing C-5 mission. Waste-associated maintenance materials include adhesives, sealants, conversion coatings, corrosion prevention compounds, hydraulic fluids, lubricants, oils, paints, polishes, thinners, cleaners, strippers, tapes, and wipes. Operations involving hexavalent chromium, cadmium, and halon (i.e., an ODS) have been eliminated or minimized to the extent possible (Boeing 2013). Hazardous materials such as TCE have available alternates and would not be required for the KC-46A MOB 3 mission. No new hazardous materials would be added that exceed Westover ARB's current hazardous waste processes.

4.4.9.3 Environmental Restoration Program

There are 21 ERP sites, two areas of concern, and two compliance restoration sites located at Westover ARB. Eighteen (18) of these sites have been closed. Proposed construction, demolition, and renovation projects associated with the proposed KC-46A MOB 3 mission at Westover ARB are on or adjacent to four ERP sites.

Implementation of the proposed MOB 3 mission would require the demolition of Buildings 2426 and 7071 to construct a 2-bay fuel cell, corrosion control, and maintenance hangar. This hangar, the fuselage trainer, and a new POV parking lot are located within ERP site Zone 1 (Sites SS-16 and SS-19). According to the Management Action Plan, the MassDEP approved a Response Action Outcome Statement for Zone 1, which is currently undergoing long-term monitoring (Westover ARB 2015g). There are nine groundwater monitoring wells (CEA-4, CEA-5, ECS-20,

ECS-21, ECS-22, OBG-8, OBG-9, OBG-10, and OBG-42) within the proposed construction area that may require abandonment and replacement.

The proposed parking ramp taxi lane repair project on the East Ramp is near two ERP sites (parking locations E-2 and E-7) associated with a JP-8 release from a Defense Logistics Agency (DLA) pipeline. Three groundwater monitoring wells (IW-2, IW-3, and IW-4) within the proposed construction area could require abandonment and replacement.

The depth to groundwater is generally 19 to 24 feet bgs at Chicopee, Massachusetts (USGS 2016). These depths are below what would be required for excavation associated with the C&D activities proposed at Westover ARB; therefore, no impacts to groundwater associated with these sites are anticipated.

Prior to initiation of construction, the USAF would work closely with the MassDEP if any of the wells mentioned above would need to be replaced or abandoned. The USAF would coordinate with the AFCEC restoration office before any construction, demolition, or renovation project is initiated. Although formal construction waivers are not required, the USAF does require reviews of excavation and/or construction siting and compatibility with environmental cleanup sites be conducted and documented in accordance with current EIAP processes, as specified in AFI 32-7061. Westover ARB would coordinate with the MassDEP prior to any construction activities on an active ERP site.

The USAF would ensure that modifications are coordinated with ongoing remediation or investigation activities at any ERP site. Adverse impacts to those ERP sites are not anticipated with implementation of the existing plans and standard policies. During C&D activities, there is the potential to encounter contaminated soil in areas associated with ERP sites. There is also the possibility that undocumented contaminated soils from historical fuel spills may be present. If encountered, storage/transport/disposal of contaminated soils would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and base policies. Should soil contaminants be encountered during C&D activities, health and safety precautions, including worker awareness training, would be required. Construction of utility corridors within previously disturbed areas would minimize impacts.

No significant impacts to ERP sites would result from the proposed MOB 3 mission. In addition, no significant impacts to human health or the environment would result from C&D disturbance on or near ERP sites.

4.4.10 Socioeconomics

4.4.10.1 Population

The current personnel at Westover ARB and the projected change anticipated to support the proposed KC-46A MOB 3 mission are provided in Table 2-15. Implementation of the proposed MOB 3 mission would potentially add up to 396 full-time mission personnel (not including contractors) and 644 military and DoD civilian dependents to the ROI, resulting in a 0.17 percent increase in the total ROI population. Calculation of this potential increase is based on the assumption that the part-time drill status reservists and contractors associated with the MOB 3 mission would be from the local population and would not be migrating to the area.

4.4.10.2 Economic Activity (Employment and Earnings)

As shown in Table 2-15, implementation of the proposed MOB 3 mission at Westover ARB would increase the full-time work force assigned to Westover ARB by 411 total personnel (including

contractors). Using the IMPLAN model, the direct effect of 411 full-time personnel at Westover ARB would have an estimated indirect and induced effect of approximately 100 jobs. Indirect and induced jobs would be created in industries such as hospitals, limited-service and full-service restaurants, retail, physician offices, individual and family services, nursing and community care services, and real estate. With a 2014 unemployment rate of 7.8 percent in Hampden County and 5.0 percent in Hampshire County (the most recent annual average for labor force data by county), it is expected that the local labor force would be sufficient to fill these new secondary jobs without a migration of workers into the area.

Construction activities provide economic benefits to the surrounding areas through the employment of construction workers and through the purchase of materials and equipment. Construction activities would be temporary and would provide a limited amount of economic benefit. The USAF estimates that \$196.9 million in MILCON expenditures would be associated with implementation of the proposed MOB 3 mission at Westover ARB. All MILCON expenditures would occur in 2017. The total expenditures could generate approximately 2,137 jobs, primarily within the construction industry or related industries, including retail stores (i.e., nonstore retailers, miscellaneous store, general merchandise), wholesale trade, and hospitals. Construction activities would occur during a 2-year period and it would be possible for a single worker to work on multiple projects. With a total labor force of 308,336 people, it is expected that the local labor force in the ROI and in the surrounding areas would be sufficient to fill these new jobs without a migration of workers into the area. Implementation of the proposed MOB 3 mission and projected total MILCON expenditures of \$196.9 million at Westover ARB would generate an estimated \$41.5 million in indirect and induced income in the ROI. The jobs and related income generated would be temporary (i.e., during the construction activity).

4.4.10.3 Housing

Although no dormitories are currently located on Westover ARB, Building 5103 (Table 2-15) would be renovated to provide housing for first-term Airmen/single Airmen. Assuming all incoming full-time personnel (not including contractors) would require off-base housing, there would be a potential need for 396 off-base housing units. Based on the number of vacant housing units in the ROI, it is anticipated that the housing market in the ROI and surrounding communities and counties would support this need.

4.4.10.4 Education

As described in Section 2.5.4.2.2, the total number of dependents, including spouse and children, was estimated at 2.5 times 65 percent of full-time active associate, active reserve, dual status technician, and non-dual status technician. The total number of children was estimated at 1.5 times 65 percent of full-time personnel, because it was assumed each military member would be accompanied by a spouse. Thus, it is estimated that 386 dependents would be of school age and would enter any of the 24 public school districts in the ROI. The incoming students would represent a 0.5 percent increase of the current total enrollment. Based on the number of schools in the ROI, it is anticipated that the schools in the ROI would have the capacity to support the incoming population. The students entering the local schools would be of varying ages and would be expected to live in different parts of the ROI. Space available for new enrollments depends on the timing of the relocation and which schools the students would attend. A large influx of students over a short period or of similar age would result in capacity constraints and would require additional personnel. A change in funding and/or in the allocation of funding could be required to support the incoming student population.

4.4.10.5 Public Services

Hampden County and Hampshire County represent a large community with police, fire, and other services. Implementation of the proposed MOB 3 mission would add approximately 1,040 USAF-related personnel and dependents, which represents a 0.17 percent increase of the ROI population. While demand for public services in the ROI would increase with the projected change in the population, it is anticipated these changes would be correlative (i.e., the increase in demand for public services is not anticipated to be significant, because the increase in population would be small [less than 1 percent]).

4.4.10.6 Base Services

Base services on Westover ARB are in good condition; however, several base services would require additional manpower and facilities to accommodate the incoming personnel associated with the proposed MOB 3 mission. No forms of childcare or youth programs are currently located on Westover ARB. However, several childcare and youth programs are available in surrounding communities in proximity to Westover ARB. It is anticipated to support the needs of incoming personnel. There is no military dining facility located on the installation and therefore, personnel would utilize off-base commercial dining facilities.

To accommodate the personnel increase that would occur with implementation of the proposed MOB 3 mission, extended operational hours for the fitness center could be required. Should operational hours be adjusted, additional FTE positions would be required at the fitness center. The USAF identified that up to one additional FTE position would also be needed to fully support the A&FR program. By meeting the additional manpower and facility requirements that have been identified, Westover ARB would be able to support the personnel increase that would occur with implementation of the proposed MOB 3 mission.

4.4.11 Environmental Justice and other Sensitive Receptors

Analysis of environmental justice and other sensitive receptors is conducted pursuant to EO 12898 and EO 13045. The only potential impact resulting from implementation of the proposed MOB 3 mission to environmental justice and other sensitive receptor populations would be related to a potential increase in noise levels. The affected area includes areas that are exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater from the proposed MOB 3 mission that would not be exposed to such noise levels under the No Action Alternative. Volume II, Appendix B, Section B.1.3, provides a description of the method applied to calculate the proportion of the population in the affected area. Section 3.4.11 provides baseline conditions of the number of minority, low-income, youth, and elderly populations currently exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater.

Aircraft-generated noise levels of 65 dB $L_{A_{dn}}$ or greater, under baseline conditions, extend beyond the base boundary. Construction and traffic noise associated with C&D and renovation of facilities would not be expected to affect the same areas as the existing aircraft noise. Construction activities would occur inside the base boundary, and construction noise would not be expected to affect off-base locations.

Analysis of the proposed MOB 3 mission noise contours relative to the baseline contours at Westover ARB indicates that no people, on or off-base, would be exposed to any additional noise levels. As described in Section 3.4.11, an estimated 38 off-base residents are exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater under baseline conditions at Westover ARB. The reduction in noise levels associated with the C-5 conversion would negate the increase in noise levels

associated with the proposed KC-46A MOB 3 mission. The net effect of the two changes would result in a beneficial effect, because the estimated 38 off-base residents would no longer be exposed to noise levels of 65 dB $L_{A_{dn}}$ or greater. As a result, there would be no effect on minority or low-income populations. In addition, no youth or elderly populations would be exposed to increased noise.

4.5 NO ACTION ALTERNATIVE

Analysis of the No Action Alternative provides a benchmark, enabling decision makers to compare the magnitude of the environmental effects of the proposed action or alternatives. Section 1502.14(d) of NEPA requires an EIS to analyze the No Action Alternative. No action for this EIS means that the proposed KC-46A MOB 3 beddown would not occur at any base at this time. The No Action Alternative would not establish the KC-46A MOB 3 and associated aircraft.

The No Action Alternative has been carried forward in the EIS per Council on Environmental Quality (CEQ) regulations and as a baseline of existing impact continued into the future against which to compare impacts of the action alternatives.

Evaluation of the No Action Alternative compares the effects of implementing the KC-46A MOB 3 mission with the effects of the No Action Alternative at each base and for each resource area.

Under the No Action Alternative:

- There would be no change in based aircraft at Grissom ARB; operations at Grissom ARB would continue as described for baseline conditions. The 434 ARW would continue to operate the existing KC-135 aircraft and the personnel described under baseline conditions would remain unchanged.
- There would be no change in based aircraft at Seymour Johnson AFB and aircraft operations would continue as described for baseline conditions. The 916 ARW would continue to fly aerial refueling missions with the existing KC-135 aircraft. Noise levels greater than or equal to 80 dB $L_{A_{dn}}$ would continue to affect off-base residential areas posing some long-term risk of NIPTS for the affected population.
- There would be no change in based aircraft at Tinker AFB and aircraft operations would continue as described for baseline conditions. The 507 ARW would continue to fly air refueling missions with the existing KC-135 aircraft. The OC-ALC, AFSC, and other major units at the base would continue operating as described in baseline conditions.
- The C-5 mission would continue at Westover ARB; however, the model of C-5 aircraft would change. As part of a previously-scheduled program that is not connected to the proposed KC-46A MOB 3 beddown process, all Westover ARB-based C-5B aircraft are being replaced with C-5M aircraft. The conversion is scheduled to be completed by 2019, roughly coinciding with the beginning of the proposed KC-46A operations should Westover ARB be selected for the proposed MOB 3 mission. Therefore, while C-5B operations are a part of baseline conditions, noise level analysis of the proposed MOB 3 mission and No Action Alternative represents operations of based C-5M aircraft.

Impacts of implementation of the No Action Alternative on each resource area evaluated in this EIS are described below.

4.5.1 Acoustic Environment

Under the No Action Alternative at Grissom ARB, Seymour Johnson AFB, and Tinker AFB, existing flying operations would continue unchanged and construction associated with the KC-46A MOB 3 beddown would not occur. Noise levels would remain as they are under existing conditions, and there would be no new noise impacts.

Under the No Action Alternative at Westover ARB, implementation of the proposed KC-46A MOB 3 mission would not occur, but the separate action of converting the 439 AW fleet from

C-5B to C-5M aircraft would still take place. The conversion of the 439 AW fleet, scheduled to be completed in 2019, is a separate and independent action that is unrelated to the proposed KC-46A MOB 3 beddown. The C-5M is substantially quieter than the C-5B (see Table 4-22), and noise levels (dB $L_{A_{dn}}$) near the base would decrease under the No Action Alternative (Figure 4-9).

The off-base area affected by noise levels greater than 65 dB $L_{A_{dn}}$ would decrease by 398 acres (86 percent decrease from 464 acres to 66 acres) (see Table 4-23). The number of on-base acres affected by noise levels greater than 65 dB $L_{A_{dn}}$ would decrease by 397 (35 percent decrease from 1,139 acres to 742 acres) (see Table 4-23). Noise levels (dB $L_{A_{dn}}$) resulting from the No Action Alternative would be very similar to noise levels resulting from implementation of the proposed MOB 3 mission. The primary reason for this lack of substantive change with implementation of the proposed MOB 3 mission is that C-5 aircraft operations are louder and more frequent than the proposed KC-46A aircraft operations, even after conversion of C-5B to C-5M. The loudest and most frequent aircraft type is the most important factor in determining overall noise levels, as measured by the $L_{A_{dn}}$ metric. The KC-46A, in comparison to the C-5, would not significantly contribute to overall noise levels.

The estimated off-base population affected by noise levels greater than 65 dB $L_{A_{dn}}$ would decrease by 38 (from 38 to 0) (Table 4-24). Off-base areas exposed to noise levels greater than 65 dB $L_{A_{dn}}$ resulting from the No Action Alternative would be entirely non-residential. Because no people reside in areas where noise levels are greater than 80 dB $L_{A_{dn}}$, either on or off base, the long-term risk of hearing loss is minimal. The same flightline building on Westover ARB affected by noise levels greater than 80 dB $L_{A_{dn}}$ from baseline conditions and the proposed MOB 3 mission would also be affected from the No Action Alternative. Hearing loss risk among people working in high-noise environments on Westover ARB would continue to be assessed and managed in accordance with DoD, OSHA, and NIOSH regulations regarding occupational noise exposure.

Aircraft noise levels at several representative locations surrounding Westover ARB are presented in Table 4-25 and on Figure 4-9. After conversion of the C-5B to C-5M, and implementation of the proposed MOB 3 mission, noise levels at several representative locations surrounding Westover ARB would decrease 3 to 9 dB $L_{A_{dn}}$.

Under the No Action Alternative, aircraft noise levels would decrease relative to baseline conditions. C-5 aircraft operations would continue to follow current time-patterns, and flights during acoustic night would continue to be rare. There would be no C&D activity or noise associated with the No Action Alternative.

4.5.2 Air Quality

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.2, 3.2.2, 3.3.2, and 3.4.2. No changes would occur. No construction emissions would occur and operational emissions would be identical to the current baseline conditions. At Westover ARB, the No Action Alternative would cause minor changes in air quality emissions. Impacts under the No Action Alternative would be minor.

4.5.3 Safety

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB would remain as described in Sections 3.1.3, 3.2.3, and 3.3.3. At Westover ARB, the No Action Alternative is not anticipated to significantly change safety as the number and types of operations would remain the same as those described under baseline conditions.

4.5.4 Soils and Water

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.4, 3.2.4, 3.3.4, and 3.4.4. None of the proposed KC-46A MOB 3 construction would occur, and no impacts to soil and water resources would occur.

4.5.5 Biological Resources

Under the No Action Alternative, baseline conditions at each of the four bases would remain as described in Sections 3.1.5, 3.2.5, 3.3.5, and 3.4.5. No vegetation or wildlife habitat would be disturbed as a result of not implementing the proposed KC-46A MOB 3 mission. No impacts on biological resources would be anticipated.

4.5.6 Cultural Resources

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.6, 3.2.6, 3.3.6, and 3.4.6. There would be no effect to cultural resources and/or historic properties.

4.5.7 Land Use

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.7, 3.2.7, 3.3.7, and 3.4.7. No changes would occur to planning noise contours surrounding the bases and no land use changes would occur within the base boundaries.

4.5.8 Infrastructure

Under the No Action Alternative, baseline conditions at each base would remain as described in the Sections 3.1.8, 3.2.8, 3.3.8, and 3.4.8. No new construction would occur and no new personnel would arrive or decrease at any of the bases. No impacts on the infrastructure system at any of the bases would occur.

4.5.9 Hazardous Materials and Waste

Under the No Action Alternative, baseline conditions at each base would remain as described in Sections 3.1.9, 3.2.9, 3.3.9, and 3.4.9. Each base would continue to use hazardous materials and dispose of hazardous waste as described for each base's baseline conditions.

4.5.10 Socioeconomics

Under the No Action Alternative, baseline conditions would remain as described in Sections 3.1.10, 3.2.10, 3.3.10, and 3.4.10. No new personnel increases or decreases would occur at any of the bases and none of the bases would receive the benefits of a population increase. No construction would occur and therefore no construction related beneficial expenditures would occur. No impacts resulting from the use of hazardous materials or the generation of hazardous waste would occur.

4.5.11 Environmental Justice and other Sensitive Receptors

Under the No Action Alternative, baseline conditions at Grissom ARB, Seymour Johnson AFB, and Tinker AFB base would remain as described in Sections 3.1.11, 3.2.11, and 3.3.11.

Under the No Action Alternative at Westover ARB, the population affected would be zero. The C-5B to C-5M conversion, missions and programs would continue regardless of whether or not

the proposed KC-46A MOB 3 mission would be implemented at Westover ARB. Therefore, disproportionate impacts to minority or low-income populations would not occur from the No Action Alternative at Westover ARB. In addition, implementation of the No Action Alternative would not expose youth or elderly populations to increased noise levels.

CHAPTER 5

CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES



5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Council on Environmental Quality (CEQ) regulations stipulate that the cumulative effects analysis in an Environmental Impact Statement (EIS) should consider the potential environmental consequences resulting from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 *Code of Federal Regulations [CFR]* 1508.7).

Actions that have a potential to interact with the proposed KC-46A Third Main Operating Base (MOB 3) mission at each of the four bases are included in this cumulative effects analysis. This approach enables decision makers to have the most current information available so that they can evaluate the range of environmental consequences that would result from the beddown of KC-46A aircraft, infrastructure, and personnel at these locations. Although known construction and upgrades are a part of the analysis contained in this document, potential future requirements of the proposed MOB 3 mission cannot be predicted. As those requirements become known, future National Environmental Policy Act (NEPA) analysis would be conducted, as required.

In this chapter, the U.S. Air Force (USAF) has identified past and present actions in the region of each of the four bases that have been selected as alternatives to host the proposed MOB 3 mission. In addition, this analysis also evaluated reasonably foreseeable future actions that are in the planning phase in the regions surrounding Grissom Air Reserve Base (ARB) in Indiana, Seymour Johnson Air Force Base (AFB) in North Carolina, Tinker AFB in Oklahoma, and Westover ARB in Massachusetts. Although the use of an auxiliary airfield has been identified for use by KC-46A aircrews at Seymour Johnson AFB, no construction, ground disturbance, or other activities beyond flight operations are proposed for those locations; therefore, cumulative effects are not evaluated for the auxiliary airfields.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship with the proposed action (CEQ 1997). The scope of the analysis must consider other projects that coincide with the location and timetable of implementation of the proposed KC-46A MOB 3 beddown at each base. Cumulative effects can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be considered as actions connected in time or space (40 *CFR* 1508.25) (CEQ 1997) could include projects that affect areas on or near any of the four bases identified as alternatives. This EIS analysis addresses three questions to identify cumulative effects:

1. Does a relationship exist such that elements of the proposed action or alternatives might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the alternatives and another action could be expected to interact, would the alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the alternative is considered alone?

For the alternative under consideration to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant. Second, the proposed action must make a substantial contribution to that significant cumulative impact. Proposed actions of

limited scope do not typically require as comprehensive an assessment of cumulative impacts as proposed actions that have significant environmental impacts over a large area (CEQ 2005).

In the sections below, the cumulative significance is based on the context, intensity and timing of the proposed KC-46A MOB 3 beddown, as discussed in Chapter 4, related to the past, present, and reasonably foreseeable actions. For each base, a summary of the cumulative effects is provided in a table, followed by a discussion of the resource areas that have potentially significant cumulative effects based on the above evaluation criteria.

5.1 GRISSOM AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed MOB 3 mission at Grissom ARB, as well as the incremental contribution of past, present, and reasonably foreseeable actions. Grissom ARB has been identified by the USAF as a reasonable alternative for the proposed MOB 3 mission.

Table 5-1 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed MOB 3 mission at Grissom ARB. Table 5-1 briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed MOB 3 mission at Grissom ARB. No other actions were identified during the data gathering and field survey phases at Grissom ARB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas (e.g., soils and water, biological resources, infrastructure, and hazardous materials and waste), the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-1. Past, Present, and Reasonably Foreseeable Actions at Grissom ARB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Top Five Military Construction (MILCON) Projects	Grissom ARB	Present, future	<p><i>Nose Dock 5 Shroud:</i> Expand current facility into an aircraft hangar by making the following additions and alterations: extend metal building, concrete floor slab and foundations, truss and column steel frame, standing seam metal roof; add brick wainscot, high expansion foam fire suppression system, automatic aircraft doors, correct Occupational Safety and Health Administration (OSHA) deficiencies, and provide handicap access.</p> <p><i>Small Arms Range Upgrade:</i> Demolish existing 15-point outdoor range. Retain weapons clearing room, storage room, rest rooms, offices, and target maintenance building if possible. Construct a 35-point indoor range and attach to any standing buildings. Install necessary environmental air quality equipment, bullet traps, and target retrieval equipment. Install parking spaces, sidewalks, access roads, storm drainage, grading, and landscaping.</p> <p><i>Visiting Quarters:</i> Construct an additional phase to the Visiting Quarters Complex consisting of 50 rooms, housekeeping storage, laundry, lounge, vending area, and building storage.</p> <p><i>Petroleum Operations Facility:</i> Construct a new, approximately 4,000 square foot, combined Petroleum Operations Facility and Laboratory. Work will include demolition of the existing facility once new construction is complete.</p> <p><i>Physical Fitness Center:</i> Construct a new 30,306-square-foot fitness center. Demolish existing fitness center upon completion of construction.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Airfield Hydrant Upgrade	Defense Logistics Agency (DLA)	Spring 2016	The upgrade will replace the existing hydrant system with a new Type III system which includes a new primary feed line from the Tank Farm to the airfield and a new aboveground storage tank (AST) near the airfield. Most of the existing piping will be abandoned in place. Fuel outlets to support KC-135 aircraft will be constructed, along with new ramp tanks and an upgraded mechanical system.	Acoustic Environment, Air Quality, Safety, Infrastructure, Hazardous Materials and Waste, Socioeconomics

Table 5-1. Past, Present, and Reasonably Foreseeable Actions at Grissom ARB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions				
Miami County Economic Development Authority (MCEDA) industrial building	Development/ MCEDA	Present	The MCEDA is developing a 57,000-square-foot shell building at the Industrial Park at Grissom Aeroplex. The facility will offer space for prospective industrial/manufacturing companies. The shell building would be located south of Discount Tire. The building is designed to allow four additions, providing approximately 240,000 square feet of space.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials and Waste, Socioeconomics
Route 31 Improvements	County	Present	Project to improve Route 31 to interstate highway standards from Interstate (I)-465 in Indianapolis, Indiana, to South Bend, Indiana. Potential interchange locations on the Route 31 improvement, as well as other potential highway improvement projects, were discussed. The recently updated Miami County Comprehensive Plan recommends that the State Highway 218 intersection with Route 31 be developed into an interchange as part of the Route 31 improvements.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials and Waste, Socioeconomics
Hoosier Boulevard Repair	County	Present	This is an \$80,000 project to resurface the road leading into Grissom Aeroplex, relocate underground lines, and round out a 90-degree curve in the road.	Acoustic Environment, Air Quality, Safety, Infrastructure, Socioeconomics

5.1.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-1) and the proposed MOB 3 mission at Grissom ARB. Table 5-2 provides a summary of the cumulative effects. As shown in Table 5-2, safety, cultural resources, land use, socioeconomics, and environmental justice and other sensitive receptors are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, and hazardous materials and waste.

Table 5-2. Summary of Cumulative Effects for Grissom ARB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	■	■	■
Air Quality	■	■	■
Safety	○	○	○
Soils and Water	■	■	■
Biological Resources	■	■	■
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	■	■	■
Hazardous Materials and Waste	■	■	■
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	○	■	○

Key: ○ – not affected or beneficial impacts, ■ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.1.2.1 Acoustic Environment

Construction and demolition (C&D) projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. Noise generated during C&D projects is localized and temporary, and construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes aircraft operations noise. Should multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

Noise generated by weapons firing in indoor small arms training ranges (see project description in Table 5-7, Top 5 MILCON Projects) is muffled by the exterior walls of the structure, whereas noise generated by weapons firing at outdoor ranges spreads with relatively little impedance. Therefore, the proposed indoor firing range would be less likely to generate noise levels of concern in adjacent areas than the existing outdoor firing range. While weapons noise is typically audible outside of indoor firing ranges, it does not typically occur at levels that have the potential to disrupt noise-sensitive activities (e.g., conversation). Although qualitatively different, weapons noise generated at the indoor firing range would be a part of the long-term acoustic environment together with KC-46A aircraft noise should the proposed MOB 3 mission occur at Grissom ARB. Cumulative impacts resulting from implementation of the proposed MOB 3

mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Grissom ARB would not be significant.

5.1.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Grissom ARB would not be significant.

5.1.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Grissom ARB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the soil and water resources at Grissom ARB would not be significant.

5.1.2.4 Biological Resources

The additional C&D projects described in Table 5-1 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Grissom ARB would not be significant.

5.1.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Grissom ARB Installation Development Plan (IDP). The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Grissom ARB would not be significant.

5.1.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-1 are anticipated to be similar to the existing hazardous materials and waste currently being used at Grissom ARB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base's capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in

conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Grissom ARB would not be significant.

5.1.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the proposed MOB 3 mission at Grissom ARB involve the consumption of material resources and energy resources. The use of these resources is considered permanent. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

For the proposed MOB 3 mission at Grissom ARB, most resource commitments would be neither irreversible nor irretrievable. Most impacts would short-term and temporary (e.g., air emissions from construction), or longer lasting but negligible (e.g., the construction of new homes to support proposed MOB 3 mission personnel increases on base or in the local communities). Those limited resources that could involve a possible irreversible or irretrievable commitment would be used in a beneficial manner.

Construction and renovation of base facilities and infrastructure would require the consumption of limited amounts of material typically associated with interior renovations (wiring, insulation, windows, and drywall) and exterior construction (concrete, steel, sand, mortar, brick, and asphalt). An undetermined amount of energy to conduct renovation, construction, and operation of these facilities would be expended and irreversibly lost, but energy would be used in an efficient and sustainable manner throughout the useful life cycle of the facilities.

Training operations would continue to involve the consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in the KC-46A aircraft and other aircraft while in flight. None of these activities are expected to significantly decrease the availability of minerals or petroleum resources. Personal vehicle use by the new personnel and those continuing to support the existing missions would consume fuel, oil, and lubricants. The amount of these materials used would increase slightly; however, this additional use is not expected to significantly affect the availability of the resources in the central Indiana region or the nation.

5.2 SEYMOUR JOHNSON AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.2.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-3 summarizes past, present, and reasonably foreseeable actions within the region that could interact with the implementation of the proposed MOB 3 mission at Seymour Johnson AFB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed MOB 3 mission. No other actions were identified during the data gathering and field survey phases at Seymour Johnson AFB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas (e.g., soils and water, biological resources, infrastructure, and hazardous materials and waste), the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Seymour Johnson Installation Master Plan 2014	Seymour Johnson AFB	3-25 years	<p>Includes projects recently completed, currently in execution, or funded. Majority of projects are MILCON funded. Top five MILCON projects currently at the installation include:</p> <p>Air Traffic Control Tower: Construct an aircraft operations building which includes Control Tower, Base Operations, In-flight Kitchen, Wing Safety, and Weather offices with all other support. Facilities provide command and control of all flight and ground operations around the installation. The control tower, Base Operations, In-flight Kitchen, Wing Safety, and Weather buildings are inadequately sized and configured for today's mission and high-tech equipment. Air traffic controllers do not have visual contact with all airfield surfaces due to facilities in the line of sight. Therefore, aircraft and ground personnel are at risk during aircraft movement. Access to the tower cab is narrow and unsafe. The control tower lacks space for required offices, operations cab, and simulator training for controllers. The Seymour Johnson AFB control tower/Radar Approach Control (RAPCON) records an annual aircraft traffic count of approximately 110,000 making it the second in Air Combat Command. These activities control 5,800 square miles of airspace. They provide radar services to 8 separate airports; assist and coordinate aircraft actions with 12 Federal Aviation Administration (FAA) Air Traffic Control Centers, Terminal Radar Approach Controls, and to control towers while managing the flow of aircraft in North Carolina's Eastern Region.</p> <p>Fitness Center (Lease and Sports Complex): The lease and sports complex will provide safe illuminated athletic fields for the City, Seymour Johnson AFB, and Wayne County residents. This proposal would be a Public-Public Public-Private (P4) Community Partnership initiative under the authority of 10 <i>United States Code (USC)</i> 2336. The City, as consideration for the lease of the property, proposes to construct an addition to the Seymour Johnson AFB Fitness Center. The addition would be 2,500 to 3,000 square feet and would provide needed space for group fitness and exercise equipment. Access to the Seymour Johnson AFB Fitness Center would continue to be for installation personnel only.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Seymour Johnson Installation Master Plan 2014 (Continued)	Seymour Johnson AFB (Continued)	3-25 years (Continued)	<p>Munitions Complex: Project constructs an armament shop, a munitions training and loading hangar, and improved GOV/private owned vehicle (POV) transportation networks. Munitions loading training is currently accomplished at a significant distance from the F-15E apron (Building 4820) and needs to be relocated. Armament storage will be designed into this new hangar to store serviceable armament assets such as guns, rails, etc. The buildings being utilized currently for Armament, as well Weapons Load Training contain multiple safety hazards and concerns which would be mitigated by this new plan. The new plan would also call for a separate gun shop area (in the same location, but separate from the main building) to facilitate a jammed Gun or Ammunition Loading System that contains live rounds. New construction will route traffic on a new perimeter road. A small fighter ramp expansion is also included. Demolishes 2124, 2125, 2141, 2150, 2152, 2153 and 2154.</p> <p>Consolidated Mission Personnel Operations Facility: A consolidated facility to provide a central location for all common personnel functions, providing one stop service. The facility will be in a convenient geographical area consistent with the General Plan for Seymour Johnson AFB. The building will efficiently accommodate 11 separate but inter-related organizations. The facility will include space for Military and Civilian Personnel, Traffic Management, Finance, Military Equal Opportunity, Law Center, Mission Support, Support Group Headquarters, Family Support Center, Printing Office, and Audio Visual. A consolidated support center is greatly needed to improve operating procedures, reduce processing time, and improve effectiveness</p> <p>Mobility/War Readiness Material Storage/Aircraft Ramp: Construct a combined storage facility in the area in front of the Radar Approach Control and Control Tower.</p>	

Table 5-3. Past, Present, and Reasonably Foreseeable Actions at Seymour Johnson AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Proposed Military Construction Project Seymour Johnson AFB Goldsboro, North Carolina	Seymour Johnson AFB	2016	<p>Construct an expansion of the existing KC-135R parking apron at the Seymour Johnson AFB, Goldsboro, Wayne County, North Carolina.</p> <p>Project to improve the ability of the 916th Air Refueling Wing (ARW) to maneuver the KC-135R aircraft into and out of parking spaces on the existing KC-135R parking apron without having to manually push or pull the aircraft into the parking spaces.</p> <p>The KC-135R parking apron does not have an adequate number of taxi lanes to allow KC-135R aircraft to pull into and out of parking spaces along the two outermost parking rows. Without the construction of the expanded parking apron, the KC-135R would need to be manually pushed back into parking spaces, which requires approximately 800 labor hours per year.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Joint Land Use Study (JLUS)	Seymour Johnson AFB; local, state, Federal stakeholders	2016	<p>The JLUS is a cooperative planning effort conducted as a joint venture between an active military installation, surrounding cities and counties, state and federal agencies, and other affected stakeholders. The Seymour Johnson AFB and Dare County Range JLUS is an 18-month study funded through a grant from the Department of Defense (DoD) Office of Economic Adjustment with contributions by the local sponsor, the State of North Carolina.</p> <p>The primary objective of a JLUS is to reduce potential conflicts between a military installation and surrounding areas while accommodating new growth and economic development, sustaining economic vitality, and protecting the general public's health and safety, without compromising the operational missions of the installation.</p>	Acoustic Environment, Safety, Land Use, Infrastructure, Socioeconomics, Environmental Justice
State and Local Actions				
I-42 (U.S. Highway 70 [U.S. 70] Goldsboro Bypass)	North Carolina Department of Transportation	2016	Twenty mile bypass that extends from U.S. 70 just west of N.C. 581 in Wayne County to U.S. 70 just east of Promise Land Road in Lenoir County. The entire bypass project costs approximately \$235 million. The project was completed in three sections, 3.9-mile central section opened in December 2011, the 5.9-mile western section opened in October 2015, and the 11.9-mile eastern section opened in May 2016. The bypass is part of plan to better connect North Carolinians to jobs, education, health care, and recreation opportunities and will provide greater access to destinations such as Seymour Johnson AFB, the state port in Morehead City, and the Global TransPark in Kinston.	

5.2.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-3) and the KC-46A beddown at Seymour Johnson AFB. Table 5-4 provides a summary of the cumulative effects. As shown in Table 5-4, safety, cultural resources, land use, and socioeconomics are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, hazardous materials and waste and environmental justice and other sensitive receptors.

Table 5-4. Summary of Cumulative Effects for Seymour Johnson AFB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	■	■	■
Air Quality	■	■	■
Safety	○	○	○
Soils and Water	■	■	■
Biological Resources	■	■	■
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	■	■	■
Hazardous Materials and Waste	■	■	■
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	■	■	■

Key: ○ – not affected or beneficial impacts, ■ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.2.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 beddown would take place near other ongoing and future C&D projects (e.g., projects identified in the 2014 Installation Master Plan) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Seymour Johnson AFB. C&D noise would be localized and temporary. Construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes elevated aircraft operations noise levels. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Seymour Johnson AFB would not be significant.

5.2.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Installation Master Plan) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Seymour Johnson AFB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Seymour Johnson AFB would not be significant.

5.2.2.3 *Soils and Water*

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Installation Master Plan) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Seymour Johnson AFB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Seymour Johnson AFB would not be significant.

5.2.2.4 *Biological Resources*

The additional C&D projects described in Table 5-3 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Seymour Johnson AFB would not be significant.

5.2.2.5 *Infrastructure*

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Installation Development Plan. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Seymour Johnson AFB would not be significant.

5.2.2.6 *Hazardous Materials and Waste*

Hazardous materials and waste resulting from the proposed projects listed in Table 5-3 are anticipated to be similar to the existing hazardous materials and waste currently being used at Seymour Johnson AFB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base's capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Seymour Johnson AFB would not be significant.

5.2.2.7 *Environmental Justice and other Sensitive Receptors*

Implementation of the proposed KC-46A MOB 3 mission at Seymour Johnson AFB would result in almost identical conditions as under baseline conditions. Noise from MILCON activities at Seymour Johnson AFB described in Table 5-3 would not be anticipated to extend off-base boundaries. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on environmental justice and other sensitive receptors at Seymour Johnson AFB would not be significant.

5.2.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the new mission at Seymour Johnson AFB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

THIS PAGE INTENTIONALLY LEFT BLANK

5.3 TINKER AIR FORCE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.3.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed KC-46A MOB 3 beddown at Tinker AFB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-5 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed KC-46A MOB 3 beddown at Tinker AFB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the proposed KC-46A MOB 3 beddown at Tinker AFB. No other actions were identified during the data gathering and field survey phases at Tinker AFB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas, such as soils and water, biological resources, infrastructure, and hazardous materials and waste, the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Top Five MILCON Projects Next 5 Years	Tinker AFB	2017-2021	<p>2017 - KC 46A Depot System Integration Laboratory, MILCON:</p> <ul style="list-style-type: none"> • Add External Storm Shelters at Child Development Center (CDC) West, Building 5510, Operations and Maintenance (O&M) • Add External Storm Shelters at CDC East, Building 3904, O&M • Correct Life Safety Code Deficiencies, Building 280, O&M • Repair By Replacement Heating, Ventilation and Air Conditioning System, Building 202, O&M <p>2018 - E-3G Mission and Flight Simulator Training Facility, MILCON:</p> <ul style="list-style-type: none"> • Refueler Vehicle Maintenance Shop, MILCON • KC 46A Mechanical Plant and Depot Site Support, MILCON • Depot Aircraft Corrosion Control Hangar, MILCON • Natural Gas Main Extension, MILCON <p>2019 - KC 46A Depot Maintenance Hangars, MILCON:</p> <ul style="list-style-type: none"> • Add 4 Hydrants to East Air Logistics Complex (ALC) Hydrant System, MILCON • E-3 Airborne Warning and Control System (AWACS) Fuels Maintenance Hangar, MILCON • Construct 552 Air Control Wing Headquarters Facility, MILCON • Add To Depot Ramp and Taxiway, MILCON <p>2020 - Force/Asset Protection Land Acquisition, MILCON:</p> <ul style="list-style-type: none"> • Repair Building 3001 W/Free Cooling Heat Exchangers, MILCON • Repair Building 9301 W/Free Cooling Heat Exchangers, MILCON • CDC, MILCON • Fully Contained, 25-Meter Small Arms Range, MILCON 	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Top Five MILCON Projects Next 5 Years (Continued)	Tinker AFB (Continued)	2017-2021 (Continued)	<p>2021 - KC 46A Depot Maintenance and Corrosion Control Hangars PH3, MILCON:</p> <ul style="list-style-type: none"> • General Purpose Warehouse, DLA, MILCON • Non-Organizational Parking Lot, Land Acquisition, MILCON • Construct New Transient Alert Facility, Building 240, MILCON • Construct New Installation Transport Network Communications Infrastructure South Tinker, MILCON 	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics (Continued)
New Control Tower	Tinker AFB	Present	<p>Construct a new 11-story Air Traffic Control (ATC) Tower to replace the current tower that is approximately 40 years old and does not meet FAA size standards for air control and training requirements.</p> <p>Construction will include reinforced concrete piers, control tower cab with tinted double glazing, elevator, flight command and administrative area, supervision and simulation training area as well as fire protection, utilities, back-up power, lighting protection, access road, and any other necessary support for a complete and useable facility. The new tower will be sited in relation to the two runways allowing personnel to conduct critical controller training and conduct operations in a high density environment.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
New Reserve AWACS Facility	Tinker AFB	Present	Construction of a multi-story, 32,000 square feet, consolidated squadron operations and Air Control Group facility. The facility will be located south of Arnold Street, approximately halfway between D Avenue and H Avenue, east of the Air Base Wing Headquarters building. The facility will provide space for flight crews and administrative support personnel for the AWACS Reserves at Tinker AFB.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker AFB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
New KC-46A Maintenance Campus	Tinker AFB	2014-2028	<p>KC-46A maintenance operations would be sited at the Burlington Northern Santa Fe Rail Yard located south of Tinker AFB. Although this property is off-base, it is just north of Building 9001 and is immediately adjacent to Tinker AFB property, within close proximity to the runway. Required facilities include 14 aircraft bays, taxiways, aircraft parking positions, aircraft fuel /defueling positions, aircraft run up positions, a 10-meter engine test cell, a kitting facility, a software integration lab, warehouse space and support facilities such as central chiller plant, fire pump house and personal vehicle parking areas.</p> <p>The proposed project will create a workload increase for Tinker AFB. During construction, an estimated 350 people would be required for the demolition and construction of the maintenance facilities. At full depot maintenance capabilities, an estimated additional 1,700 office and maintenance personnel would be required to maintain the KC-46A fleet, as well as continued maintenance on the KC-135 as it is being phased out. Select projects from this overall project are included in the top five MILCON projects listed above.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
New Truck Gate	Tinker AFB	Present	A truck inspection gate is located on SE 59th Street, north of the Burlington Northern Santa Fe alternative site. This gate serves to inspect commercial vehicles prior to base entry. The truck inspection gate is being relocated to the west side of the Burlington Northern Santa Fe site along Air Depot Boulevard.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Replace Fuel Distribution Facilities	MILCON DLA	Present	This project includes the removal and replacement of the fiberglass fuel line from Facility 273 to Facility 995. Ten fuel hydrant outlets will be added and 13 will be replaced. The fuel storage tanks will be refurbished, and the Type II pump house will be replaced. Additionally, a Base Military Service Station will be constructed.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions				
Boeing Manufacturing Facility	Oklahoma City	Present	Boeing is currently adding on to an existing facility with an \$80 million, 290,000 square foot expansion. This will be the third structure in the aerospace company's growing Oklahoma City campus and provide facilities for approximately 800 employees. The new building structure is scheduled to open in 2016 at the company's campus near the south gate of Tinker AFB and will house employees in engineering, research and development laboratories and support staff.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Northeast Oklahoma County Loop	Oklahoma Department of Transportation	3-5 years	One new stretch of turnpike, referred to as the Northeast Oklahoma County Loop, will require the construction of 21 miles of toll roads that will link I-40 and the Turner Turnpike (I-44) in the eastern part of the Oklahoma City metro area. The new turnpike is expected to link up with I-40 a few miles east of Tinker AFB and the Choctaw Road interchange and extend north to hook up with the Turner Turnpike near Luther. Designed to alleviate traffic congestion and reduce the drive time between Tulsa and the Oklahoma City metro area, the cost of that project is estimated at \$300 million.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-5. Past, Present, and Reasonably Foreseeable Actions at Tinker and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
State and Local Actions (Continued)				
Traffic Interchange Improvements	Oklahoma Department of Transportation	Summer 2015	<p>Recent improvements were made to the traffic interchanges in the areas of Interstate 40, SE 29 and Air Depot Boulevard, including improvements south to the Tinker Gate at Tinker AFB.</p> <p>Oklahoma Department of Transportation has begun making the improvements along I-40, which include strengthening the barrier wall at the curve in the area of SE 29.</p> <p>Additional construction plans along I-40 and Air Depot include:</p> <ul style="list-style-type: none"> • Laying a high-friction pavement material along the curve, eastbound and westbound on I-40. • Adding roadway warning signs about the upcoming curve, eastbound and westbound. • Increasing traffic capacity of the I-40 eastbound and westbound exit ramps onto Air Depot by adding second lanes. • Adding traffic lights at the end of the westbound and eastbound exit ramps off I-40 onto Air Depot. • Adding a right-turn-only lane at the end of the eastbound exit ramp onto Air Depot south into Tinker AFB. • Adding a right-turn-only lane at the end of the westbound exit ramp onto Air Depot north into Midwest City. • Adding two new left-turn-only lanes, with signals, underneath the I-40 overpass: a new lane for northbound traffic and a new lane for southbound traffic servicing the entrance ramps onto I-40. • Widening of northbound and southbound lanes of Air Depot underneath the I-40 overpass, south of SE 29. • The existing lights at SE 29 and at Boeing Avenue and the new lights at the ramps will be coordinated to allow better traffic flow through the intersection and south under I-40. • Reconfiguring the SE 29 westbound median to add additional left-turn lane capacity for turning onto southbound Air Depot. • Adding a new eastbound traffic lane on SE 29, through the Air Depot intersection. • Creating a new right-turn-only lane south onto Air Depot off SE 29. • Constructing a new sidewalk from the Tinker Gate to Town Center Plaza. 	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

5.3.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-5) and the KC-46A beddown at Tinker AFB. Table 5-6 provides a summary of the cumulative effects. As shown in Table 5-6, safety, cultural resources, land use, and socioeconomics are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, hazardous materials and waste and environmental justice and other sensitive receptors.

Table 5-6. Summary of Cumulative Effects for Tinker AFB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	■	■	■
Air Quality	■	■	■
Safety	○	○	○
Soils and Water	■	■	■
Biological Resources	■	■	■
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	■	■	■
Hazardous Materials and Waste	■	■	■
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	■	■	■

Key: ○ – not affected or beneficial impacts, ■ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.3.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 beddown would take place near other ongoing and future C&D projects (e.g., New Control Tower) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Tinker AFB. C&D noise is localized and temporary. Construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes elevated aircraft operations noise levels. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

Noise generated during operations at the new KC-46A Maintenance Campus has been assessed for environmental impacts (USAF 2014c) and is included in baseline conditions for this EIS (see Section 3.3.1). KC-46A depot maintenance operations will take place in the context of an active installation currently supporting a multitude of similar operations. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Tinker AFB would not be significant.

5.3.2.2 *Air Quality*

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., New Control Tower, New KC-46A Maintenance Complex) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Tinker AFB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Tinker AFB would not be significant.

5.3.2.3 *Soils and Water*

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., New Control Tower, New KC-46A Maintenance Complex) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Tinker AFB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Tinker AFB would not be significant.

5.3.2.4 *Biological Resources*

The additional C&D projects described in Table 5-5 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Tinker AFB would not be significant.

5.3.2.5 *Infrastructure*

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Installation Master Plan. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Tinker AFB would not be significant.

5.3.2.6 *Hazardous Materials and Waste*

Hazardous materials and waste resulting from the proposed projects listed in Table 5-5 are anticipated to be similar to the existing hazardous materials and waste currently being used at Tinker AFB. The use of these materials could increase with the additional projects but that use is not anticipated to exceed the base's capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous waste and materials at Tinker AFB would not be significant.

5.3.2.7 Environmental Justice and other Sensitive Receptors

Implementation of the proposed KC-46A MOB 3 mission at Tinker AFB would result in almost identical conditions as under baseline conditions. Noise from MILCON activities at Tinker AFB described in Table 5-5 would not be anticipated to extend off-base boundaries. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on environmental justice and other sensitive receptors at Tinker AFB would not be significant.

5.3.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the proposed KC-46A MOB 3 beddown at Tinker AFB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

5.4 WESTOVER AIR RESERVE BASE CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.4.1 Past, Present, and Reasonably Foreseeable Actions

This section provides decision makers with the cumulative effects of the proposed MOB 3 beddown at Westover ARB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-7 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed MOB 3 beddown at Westover ARB. The table briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources potentially interact with the KC-46A beddown at Westover ARB. No other actions were identified during the data gathering and field survey phases at Westover ARB for this EIS.

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas, such as soils and water, biological resources, infrastructure, and hazardous materials and waste, the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-7. Past, Present, and Reasonably Foreseeable Actions at Westover ARB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Fiscal Year 2015-2016 Installation Plan	Westover ARB	2015-2016	This list contains over 50 projects planned for 2015-2016 at Westover ARB. Projects include numerous facility renovations, utility repairs, runway concrete work, fence repairs, and other maintenance activities.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Top Five MILCON Projects	Westover ARB	2015-2020	<p>Indoor Small Arms Range: Construct a properly sized, configured and fully contained Indoor Small Arms Range at Westover ARB to provide adequate year round training to military personnel that require certification in the use of up to 45 caliber handguns, 12 gauge shotguns, and rifles up to 7.62 millimeters.</p> <p>Maintenance Facility Shops: Demolish Buildings 7071 and 2426, relocate the existing government vehicle fueling operation, and construct a properly sized and consolidated C-5 aircraft maintenance shop facility. Existing shops are located across multiple hangars and buildings not conducive for maintaining C-5 aircraft. Existing buildings are 1940s-era structures configured for obsolete aircraft are energy inefficient and require extensive repair. Construction of a new maintenance facility will consolidate all the shops into one building eliminating duplication of functions and allow the base to demolish approximately 100,000 square feet of 70-year-old facility space.</p> <p>Regional ISO Maintenance Hangar: Construct a properly sized and configured fully enclosed aircraft maintenance hangar and demolish Building 7072. The Regionalized ISO Inspection Program is performed in a hangar which cannot physically accommodate the tail section of the C-5. This exposes personnel to seasonal inclement weather delaying inspection/maintenance turn-around times.</p> <p>Overruns, Runway 15/33: Construct paved overruns to Runway 15/33 which is an existing Class B runway. The existing runway does not have paved overruns as required for an approved Class B runway. Assigned C-5 aircraft use this 7,100-foot runway during critical crosswind conditions. Runway is further restricted to Visual Flight Rules conditions only. Existing drainage structures and airfield lighting will need to be adjusted to accommodate the 1,000-foot overruns.</p>	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics

Table 5-7. Past, Present, and Reasonably Foreseeable Actions at Westover ARB and Associated Region (Continued)

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions (Continued)				
Top Five MILCON Projects (Continued)	Westover ARB (Continued)	2015-2020 (Continued)	Addition to Fitness Center: 24,242 square feet addition to existing fitness center. Construction includes: foundations, structure, all utilities, lighting, landscaping, site improvements, fire alarm/suppression, communications, demolition of pavement, and all other necessary work. The new addition will include space for additional cardio and aerobics rooms, additional bathrooms and locker room space and an indoor running track. The project would incorporate applicable aspects of the Air Force Reserve Command (AFRC) Energy Policy.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics (Continued)
Manage Airfield Vegetation to Protect Flight Safety	Westover ARB	2015-Present	Westover ARB is altering vegetation management at the installation to comply with AFI 91-202. Compliance would include more frequent mowing of the grassland areas surrounding the airfield.	Air Quality, Safety, Soils and Water, Biological Resources, Socioeconomics
State and Local Actions				
Metro-Goldwyn-Mayer (MGM) Springfield	MGM	Present-2017	MGM Resorts International is constructing an approximately \$800 million casino resort slated to open in fall 2017 in Downtown Springfield. This will be the first destination casino resort in Massachusetts. MGM Springfield estimates that the project will bring 3,000 permanent jobs and 2,000 construction jobs to Downtown Springfield. MGM has established a hiring goal of 35 percent of the workforce from the City of Springfield and 90 percent from a combination of Springfield and the region. The mixed-used development includes a hotel; 125,000 square feet of gaming space; about 55,000 square feet of retail and restaurant space that will accommodate 15 shops and restaurants; and a multi-level parking garage. Plans also envision a high-energy dining, retail and entertainment district with an eight-screen cinema, bowling alley and an outdoor stage. This will be developed by Davenport Properties of Boston, MA, in partnership with MGM on land now occupied by the South End Community Center and the Zanetti School.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Northern New England InterCity Rail Initiative	Massachusetts Department of Transportation and Vermont Agency of Transportation	Unknown	The Massachusetts Department of Transportation and the Vermont Agency of Transportation, in collaboration with the Connecticut Department of Transportation, are conducting a study to examine the opportunities and impacts of more frequent and higher speed intercity passenger rail service on two major rail corridors known as the Inland Route and the Boston to Montreal Route.	Acoustic Environment, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure, Hazardous Materials, and Waste, Socioeconomics
Aviation Research and Training Center at the Westover ARB	University of Massachusetts Amherst and M2C Aerospace, Inc.	2017	The University of Massachusetts Amherst and M2C Aerospace, Inc., of Milford, Massachusetts, are developing a new Aviation Research and Training Center at Westover ARB. The center is located at Westover ARB in space leased from USAF and staffed by UMass Amherst faculty and students and scientists from M2C. It will use a high-fidelity 360-degree air traffic control tower simulator that will be modified for three-dimensional views of a variety of operational environments. The aviation center is scheduled to open at the Westover location during the spring semester of 2017. Approximately 27,000 square feet will be renovated, about 7,000 of which will accommodate the simulator.	Safety, Infrastructure, Socioeconomics

5.4.2 Cumulative Effects

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-7) and the proposed KC-46A MOB 3 beddown at Westover ARB. Table 5-8 provides a summary of the cumulative effects. As shown in Table 5-8, safety, cultural resources, land use, socioeconomics, and environmental justice and other sensitive receptors are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for acoustic environment, air quality, soils and water, biological resources, infrastructure, and hazardous materials and waste.

Table 5-8. Summary of Cumulative Effects for Westover ARB

Resource Area	Proposed MOB 3 Mission	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Acoustic Environment	■	■	■
Air Quality	■	■	■
Safety	○	○	○
Soils and Water	■	■	■
Biological Resources	■	■	■
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	■	■	■
Hazardous Materials and Waste	■	■	■
Socioeconomics	○	○	○
Environmental Justice and other Sensitive Receptors	○	■	○

Key: ○ – not affected or beneficial impacts, ■ – affected but not significant, short to medium term, impacts that range from low to high intensity, ● – significant impacts, that are high in intensity or are long term.

5.4.2.1 Acoustic Environment

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top 5 MILCON Projects) occurring during the same time periods. C&D projects are a regular occurrence on and near active USAF installations such as Westover ARB. C&D noise is localized and temporary and construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes aircraft operations noise. In the instance that multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

As discussed in section 4.4.1, the conversion of the Westover ARB-based C-5 fleet from C-5B aircraft to C-5M aircraft, when taken in combination with proposed MOB 3 mission aircraft operations, would result in reduction in A-weighted day-night average sound level ($L_{A_{dn}}$) aircraft noise levels on and near the installation. The C-5 conversion is currently under way, and is scheduled for completion at approximately the same time that the proposed MOB 3 mission would begin operations.

Noise generated by weapons firing in indoor small arms training ranges (see project description in Table 5-7, Top 5 MILCON Projects) is muffled by the exterior walls of the structure. While weapons noise is typically audible outside of indoor firing ranges, it does not typically occur at levels that have the potential to disrupt activities. Weapons noise generated at the indoor firing range would be a part of the long-term acoustic environment similar to aircraft noise generated

by KC-46A aircraft if the proposed MOB 3 mission were to occur at Westover ARB. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Westover ARB would not be significant.

5.4.2.2 Air Quality

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Westover ARB. These projects would generate the same types of construction related impacts as described for the proposed MOB 3 mission (e.g. fugitive dust emissions, increases in construction related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on air quality at Westover ARB would not be significant.

5.4.2.3 Soils and Water

C&D projects associated with the proposed MOB 3 mission would take place near other ongoing and future C&D projects (e.g., Top Five MILCON Projects) during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Westover ARB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on soil and water resources at Westover ARB would not be significant.

5.4.2.4 Biological Resources

The additional C&D projects described in Table 5-7 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the construction impacts for the proposed KC-46A MOB 3 mission. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Westover ARB would not be significant.

5.4.2.5 Infrastructure

The proposed MOB 3 mission would require additional facility C&D when considered in combination with the Westover ARB Installation Plan and other projects described in Table 5-7. The proposed MOB 3 mission would require the construction of new facilities, renovation/alteration/additions to existing facilities, and demolition of facilities. These new facilities would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Westover ARB would not be significant.

5.4.2.6 Hazardous Materials and Waste

Hazardous materials and waste resulting from the proposed projects listed in Table 5-7 are anticipated to be similar to the existing hazardous materials and waste currently being used at Westover ARB. The use of these materials could increase with the additional projects but that

use is not anticipated to exceed the base's capability for handling hazardous waste and materials. Cumulative impacts resulting from implementation of the proposed MOB 3 mission in conjunction with past, present, and reasonably foreseeable future actions on hazardous materials and waste at Westover ARB would not be significant.

5.4.3 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes and irretrievable commitment of resources that would result from implementation of the proposed KC-46A MOB 3 beddown at Westover ARB would be similar in nature and have similar characteristics to those identified for Grissom ARB in Section 5.1.3.

THIS PAGE INTENTIONALLY LEFT BLANK

REFERENCES



REFERENCES

- Abrams, Donald (Buck) 2016. Personal Communication between Mr. Buck Abrams (4 CES/CEI) and Leidos Team on 7 July 2016. KC-46A MOB 3 Beddown EIS.
- ACOG 2008. Association of Central Oklahoma Governments. *Defending Oklahoma's Future: Tinker AFB Joint Land Use Study (JLUS)*. September 2008.
- AFCEC 2014a. Air Force Civil Engineer Center. *Final KC-46A Formal Training Unit (FTU) and First Main Operating Base (MOB 1) Beddown EIS*. Air Mobility Command Air Education and Training Command USAF. March 2014.
- AFCEC 2014b. Air Force Civil Engineer Center. *Air Emissions Guide for Air Force Mobile Sources - Methods for Estimating Emissions of Air Pollutants for Mobile Sources at U.S. Air Force Installations*. Compliance Technical Support Branch. Table 2-4, KC-135 Aircraft.
- AFCEC 2016. Air Force Civil Engineer Center. *2013 Mobile Air Emissions Inventory for Westover ARB*. The Air Program Information Management System (APIMS).
- AFRC 1998. Air Force Reserve Command. *Pollution Prevention Strategic Plan*, Air Force Reserve Command. October.
- AFSC 2016. Air Force Safety Center. *U.S. Air Force Wildlife Strikes by Altitude FY1995-FY2014*. Retrieved from: <http://www.afsec.af.mil/shared/media/document/AFD-141209-034.pdf> on 15 March 2016.
- AMC 2004. Air Mobility Command. *55th ARS Inflight Guide All Original*. 21 August 2004.
- AMC 2012. Air Mobility Command. Mobility Air Forces Fuel Jettison Policy, Authority: HQ AMC/A37V FCIF, 3 May 2012.
- AMC 2013. Air Mobility Command. 618th Air and Space Operations Center (Tanker Airlift Control Center) DATA DIVISION 618 AOC (TACC)/XOND Data adjusted gross weight information for the KC46 environmental impact study for KC46 basing CY2008 – CY2012 for KC135s and KC10s.
- Aviation Safety Network 2016. Aircraft Type Index. Boeing 767. Retrieved from: <https://aviation-safety.net/database/types/Boeing-767/index>.
- Bailey, Robert G. 1995. *Description of the Ecoregions of the United States*. 2nd edition revised and expanded (1st ed. 1980). Miscellaneous Publication No. 1391 (rev.). U.S. Department of Agriculture, Forest Service. Washington, DC Retrieved from: <http://www.fs.fed.us/land/ecosysmgmt/index.html> 1 April 2016.
- Barkes, Richard 2016. Personal Communication between Mr. Richard Barkes, Interim Executive Director of the North Carolina Global TransPark, and Jay Austin, Leidos via e-mail with subject 'General information on military usage of the Kinston Regional Jetport' on 4 February 2016.
- BEA 2015a. Bureau of Economic Analysis. CA25N Total Full-Time and Part-Time Employment by NAICS Industry 1/: County. Query for: Cass County, Indiana; Miami County, Indiana; Wayne County, North Carolina; North Carolina; Oklahoma County, Oklahoma; Hampden County, Massachusetts; and Hampshire County, Massachusetts.

- BEA 2015b. Bureau of Economic Analysis. CA5N Personal Income by Major Component and Earnings by NAICS Industry 1/: County. Query for: Cass County, Indiana; Miami County, Indiana; Wayne County, North Carolina; North Carolina; Oklahoma County, Oklahoma; Hampden County, Massachusetts; and Hampshire County, Massachusetts.
- BLS 2016a. Bureau of Labor Statistics. “Labor Force Data by County, 2014 Annual Averages.” Retrieved from: <http://www.bls.gov/lau/laucnty14.txt> on 15 March 2016.
- BLS 2016b. Bureau of Labor Statistics. “Local Area Unemployment Statistics: Unemployment Rates for States.” Retrieved from: <http://www.bls.gov/lau/lastrk14.htm> on 15 March 2016.
- Boeing 2013. *KC-46 Tanker Program, National Environmental Policy Act (NEPA) Facilitation Report*. 7 May 2013.
- Boeing 2015. Statistical Summary of Commercial Jet Airplane Accidents – Worldwide Operation 1959-2014. Seattle, Washington.
- Boyd, R.L. 1991. First nesting record for the piping plover in Oklahoma. *Wilson Bulletin* 103:305-308.
- Cass County 2009. Comprehensive Plan Cass County, Indiana. Retrieved from: <http://www.co.cass.in.us/dav/planning/planning.html>, on March 8, 2016.
- CEQ 1997. Council on Environmental Quality, 1997. Considering Cumulative Effects under the National Environmental Policy Act. Executive Office of the President. January 1997.
- CEQ 2005. Council on Environmental Quality, 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. Memorandum from the Executive Office of the President. 24 June 2005.
- CH2MHill 2010. *Final - Tinker Air Force Base 2009 Mobile Source Emission Inventory*.
- CHABA 1977. Committee on Hearing, Bioacoustics, and Biomechanics. *Environmental Impact Statements with Respect to Noise*. Report of Working Group 69, Committee on Hearing, Bioacoustics, and Biomechanics, National Research Council. Washington, DC; National Academy Press.
- Consumer Reports 2016. “Logansport Memorial Hospital.” Retrieved from: <http://www.consumerreports.org/health/doctors-hospitals/hospitals/hospital-ratings/logansport> on 29 March 2016.
- Countess Environmental 2006. Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. Countess Environmental, Westlake Village, California for Western Governors’ Association, Denver Colorado. Retrieved from: http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf.
- Cox, Deborah C. 1981. *Archaeological Reconnaissance Survey of Westover Air Force Base, Massachusetts*. The Public Archaeology Laboratory. On file, Massachusetts Historical Commission, Boston.
- Czuba, Nathan, 1st Lt. 2016. Personal Communication between 1st Lt. Nathan Czuba (4 CES/CENPE) and Leidos Team on 7 July 2016. KC-46A MOB 3 Beddown EIS.
- Deepti, K.C. 2003. *Environmental Assessment of Fuel Jettisoning and Development of a Geographical/Environmental Modeling with GIS Software*.

- DNWG 2013. Department of Defense Noise Working Group. Technical Bulletin, Noise-Induced Hearing Impairment, December 2013 (DNWG TB2013-2).
- DoD 2007. U.S. Department of Defense. *DoD Facilities Pricing Guide*. United Facilities Criteria (UFC) 3-701-07. 2 July.
- DoD 2009. U.S. Department of Defense. *DoD Facilities Pricing Guide*. United Facilities Criteria (UFC) 3-701-09. 15 September.
- DoD 2010. U.S. Department of Defense. Department of Defense Strategic Sustainability Performance Plan - FY 2010. Available online at <http://www.denix.osd.mil/sustainability/PlansGuidance.cfm>.
- DoD 2012. U.S. Department of Defense. Department of Defense Strategic Sustainability Performance Plan, FY 2012, September 2012.
- DoD 2013. U.S. Department of Defense. Unified Facilities Criteria (UFC) 04-010-01, DoD *Minimum Antiterrorism Standards for Buildings*. Retrieved from: https://www.wbdg.org/ccb/DOD/UFC/ufc_4_010_01.pdf on 15 March 2016.
- DoD 2015. U.S. Department of Defense Strategic Sustainability Performance Plan - FY 2015. Available online at <http://www.denix.osd.mil/sustainability/PlansGuidance.cfm>.
- Dukes Memorial Hospital 2016. "About us." Retrieved from: <http://www.dukesmemorialhosp.com/interior/php?t=1&title=AboutUs> on 29 March 2016.
- EEA 2016a. Energy and Environmental Affairs. Office of Energy and Environmental Affairs. Chicopee River Watershed. Retrieved from: <http://www.mass.gov/eea/waste-mgmt-recycling/water-resources/preserving-water-resources/mass-watersheds/chicopee-river-watershed.html>.
- EEA 2016b. Energy and Environmental Affairs. Office of Energy and Environmental Affairs. Total Maximum Daily Loads (TMDLs) Retrieved from: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdl.html>.
- FAA 2016. Federal Aviation Administration. Air Traffic Activity System. Retrieved from: <https://aspm.faa.gov/opsnet/sys/Main.asp?force=atads>. on 16 January 2016.
- FHWA 2006. Federal Highway Administration. Roadway Construction Noise Model (RCNM) Manual. January 2006.
- Finegold et al. 1994. Lawrence S., Harris, Stanley, Von Gierke, Henning 1994. Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People. *Noise Control Engineering Journal* 41(1). January-February 1994.
- Gale, Donald 2015. AFCEC/AFRC Site Survey Team data request for POL consumption over the past three years at Westover ARB, Chicopee, MA.
- Goldsboro 2016. City of Goldsboro, North Carolina. Retrieved from: <http://www.ci.goldsboro.nc.us/> on 7 April 2016.
- Griffith et al. 2002. Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Shafale, W.H. McNab, D.R. Lenat, J.B. Glover, and V.B. Shelburne 2002. Ecoregions of North Carolina and South Carolina. (map poster). U.S. Geological Survey, Reston, VA. Scale 1:1,500,000.

- Grissom ARB 2002. Grissom Air Reserve Base. *Integrated Solid Waste Management Plan (ISWMP)* for Grissom Air Reserve Base. HQ AFRC/CEVQ. Robins Air Force Base, GA. September 2002.
- Grissom ARB 2003. Grissom Air Reserve Base. *2002 Air Emissions Inventory (Stationary and Mobile Sources) – Grissom Air Reserve Base*. ©2003 Ecology and Environment, Inc. April 2003.
- Grissom ARB 2008. Grissom Air Reserve Base. Grissom Air Reserve Base. *Land Use Management Plan*. Grissom Air Reserve Base, Indiana. Updated October 2008.
- Grissom ARB 2010a. Grissom Air Reserve Base. 434 Bird-Aircraft Strike Hazard Plan. OPR: 434 ARW/SE. 434th Air Refueling Wing (AFRC) Grissom Air Reserve Base, IN 46971-5000. September 2010.
- Grissom ARB 2010b. Grissom Air Reserve Base. *Asbestos Management Plan*, Air Force Reserve Command, 434th Air Refueling Wing, Grissom Air Reserve Base, Indiana. December.
- Grissom ARB 2011. Grissom Air Reserve Base. Grissom Air Reserve Base. *Integrated Natural Resources Management Plan (INRMP)*. Grissom ARB, Indiana. January 2011.
- Grissom ARB 2012. Grissom Air Reserve Base. *Lead-Based Paint Management Plan (LBMP)*, Air Force Reserve Command, 434th Air Refueling Wing, Grissom Air Reserve Base, Indiana. January.
- Grissom ARB 2013. Grissom Air Reserve Base. *Hazardous Waste Management Plan (HWMP)*, Air Force Reserve Command, 434th Air Refueling Wing, Grissom Air Reserve Base, Indiana. Originally dated June 2011. Revised June 2013.
- Grissom ARB 2014a. Grissom Air Reserve Base. *Air Force Instruction 32-7086, Grissom Air Reserve Base Supplement, Hazardous Materials Management*, Grissom Air Reserve Base, Indiana. 14 November 2014.
- Grissom ARB 2014b. Grissom Air Reserve Base. *Hazardous Material Emergency Planning and Response Plan*, Air Force Reserve Command, 434th Air Refueling Wing, Grissom Air Reserve Base, Indiana. December 2014.
- Grissom ARB 2014c. Grissom Air Reserve Base. *Stormwater Pollution Prevention Plan (SWPPP)*. Grissom ARB, Indiana. Headquarters, Air Force Reserve Command HQ AFRC/CEVQ. November 2014.
- Grissom ARB 2014d. Grissom Air Reserve Base. *Grissom Air Reserve Base Installation Development Plan (IDP)*. 434th Air Refueling Wing. Grissom Air Reserve Base, IN. Forthcoming.
- Grissom ARB 2015a. Grissom Air Reserve Base. Grissom Air Reserve Base. *Management Action Plan*, Grissom Air Reserve Base, Indiana. November 2015.
- Grissom ARB 2015b. Grissom Air Reserve Base. Grissom Air Reserve Base. Site Survey Questionnaire. April 2015.
- Hartsfield, Michael 2016. Personal Communication between Mr. Michael Hartsfield (4 CES/CEOI) and Leidos Team on 7 July 2016. KC-46A MOB 3 Beddown EIS.

- Hays, Doug 2015. Personal Communication between Mr. Doug Hays (Grissom Air Reserve Base Public Affairs) and Leidos Team Site Visit on 8 Dec 2015. KC-46A MOB 3 Beddown EIS.
- Heikkinen, Staff Sgt. Katrina 2016. “Grissom makes economic impact of \$124.9 million for FY15.” Air Force Print News Today. 25 January 2016. Retrieved from: http://www.grissom.afrc.af.mil/news/story_print.asp?id=123467535 on 15 March 2016.
- ICAO 2013a. International Civil Aviation Organization. ICAO Engine Exhaust Emissions Data Bank – Subsonic Engines. Engine Identification: CFM56-2B-1. Test Organization: CFM56 Evaluation Engineering. Test Dates: 11 November 1983 to 14 November 1983.
- ICAO 2013b. International Civil Aviation Organization. ICAO Engine Exhaust Emissions Data Bank - Subsonic Engines. Engine Identification: PW4062. Test Organization: Pratt and Whitney. Test Dates: November 30, 2012 to March 12, 2013.
- IDEM 2014. Indiana Department of Environmental Management. 2014 Indiana Municipal Solid Waste (MSW) Landfill Capacity & Life. Retrieved from: http://www.in.gov/idem/landquality/files/sw_msw_landfill_capacity.pdf 12 May 2016.
- IDEM 2016. Indiana Department of Environmental Management Agency Rules. Retrieved from: <http://www.in.gov/idem/4686.htm>.
- IDNR 2013a. Indiana Department of Natural Resources. Mammals of Indiana. Retrieved from: 4 April 2016. http://www.in.gov/dnr/fishwild/files/fw-Mammals_Of_Indiana.pdf
- IDNR 2013b. Indiana Department of Natural Resources. Freshwater Mussels of Indiana. Retrieved from: 4 April 2016. http://www.in.gov/dnr/fishwild/files/fw-Freshwater_Mussels_Of_Indiana.pdf.
- IDNR 2016. Indiana Department of Natural Resources. Division of Fish and Wildlife. Early Coordination/Environmental Assessment. Response Letter to Grissom Air Reserve Base dated 4 April 2016. Project: Potential KC-46A Third Main Operating Base (MOB 3) Beddown at Grissom Air Reserve Base. Location: Grissom Air Reserve Base, Miami and Cass Counties, Indiana.
- IDOE 2016. Indiana Department of Education. “Search School and Corporation Reports.” Query for: Caston School Corporation; Logansport School Corporation; Pioneer School Corporation; Southeastern School Corporation; Maconaquah School Corporation; North Miami School Corporation; Oak Hill School Corporation; and Peru School Corporation. Retrieved from: <http://compass.doe.in.gov/dashboard/overview.aspx>.
- IN DOT 2011. Indiana Department of Transportation. Indiana Average Daily Traffic and Commercial Vehicles Interactive Map. Retrieved from: <https://entapps.indot.in.gov/TrafficCounts/> on 14 April 2016.
- IndianaMap 2016. IndianaMap Open Data Site. Indiana Geographic Information Council (IGIC) and the Indiana Geological Survey (IGS). Retrieved from: <http://data.indianamap.opendata.arcgis.com/>
- Indiana State Police 2016. District 16 – Peru. Retrieved from: <http://www.in.gov/isp/3164.htm> on 29 March 2016.

- IPCC 2013. Intergovernmental Panel on Climate Change. *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.
- Jones et al. 1994. Jones, Donald G., Sally Pendleton and Nicole A. Missio (1994). *Results of a Cultural Resources Reconnaissance Survey of Westover Air Reserve Base in Massachusetts*. Office of Public Archaeology, Boston University. Boston.
- Jones 2016. Major Jones. Personal communication from Major Jones (4 FW Safety POC) via meeting with Leidos Team Site Visit regarding deicing operations. Seymour Johnson Air Force Base. 25 January 2016. KC46-A MOB3 Beddown EIS.
- Klepeis et al. 2001. Neil E., Nelson, William C., Ott, Wayne R., Robinson, John P., Tsang, Andy M., Switzer, Paul, Behar, Joseph, V., Hern, Stephen C., Engelman, William H 2001. The National Human Activity Pattern Survey: A Resource for Assessing Exposure to Environmental Pollutants.
- Kline, Kim 2015. Personal communication from Kim Kline (72 ABW/CENP) via meeting with Leidos Team Site Visit regarding hazardous waste at Tinker AFB, Oklahoma. 16 December 2015. KC-46A MOB 3 Beddown EIS.
- LaBahn, Major Kathleen 2015. AFCEC/AFRC Site Survey Team data request for POL storage capacity and consumption over the past three years. 30 February 2015.
- MADESE 2016. Massachusetts Department of Elementary and Secondary Education. "School/District Profiles." Retrieved from: <http://profiles.doe.mass.edu/> on 29 March 2016.
- Mass DEP 2006. Massachusetts Department of Environmental Protection. Westover Air Reserve Base 50% Cap Notification Approval.
- Mass DEP 2016. Massachusetts Department of Environmental Protection. Energy and Environmental Affairs - Air Quality Laws & Rules. Retrieved from: <http://www.mass.gov/eea/agencies/massdep/air/regulations/>.
- Matrix Design Group 2016. Seymour Johnson AFB & Dare County Range Joint Land Use Study Fact Sheet #1. Retrieved from: http://www.northeastncregionaljlus.com/images/docs/sj_fact_sheet_1.pdf on 10 March 2016.
- MDFW 2015. Massachusetts Division of Fisheries and Wildlife. Natural Heritage & Endangered Species Program. Eastern Spadefoot (*Scaphiopus holbrookii*). Retrieved from: 5 April 2016. <http://www.mass.gov/eea/docs/dfg/nhesp/species-and-conservation/nhfacts/scaphiopus-holbrookii.pdf>
- MDFW 2016. Massachusetts Division of Fisheries and Wildlife. Natural Heritage & Endangered Species Program. Rare Species of Massachusetts. Retrieved from: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesalist/list-of-rare-species-in-massachusetts.html> on 5 April 2016.
- Miami County 2015. Miami County Comprehensive Plan, Draft. March 2015.
- Minnesota IMPLAN Group (MIG, Inc.) 2012. IMPLAN® (IMPact Analysis for PLANning) Version 3.1 (Computer program). Hudson, WI.

- Moriarty, Jack 2015a. Personal communication from Jack Moriarty (439 MSG/CEV) via meeting with Leidos Team Site Visit regarding hazardous waste at Westover ARB, Massachusetts. 17 November 2015. KC-46A MOB 3 Beddown EIS.
- Moriarty, Jack 2015b. Personal communication from Jack Moriarty (439 MSG/CEV) via meeting with Leidos Team Site Visit regarding infrastructure at Westover ARB, Massachusetts. 17 November 2015. KC-46A MOB 3 Beddown EIS.
- NC DENR 2016. North Carolina Department of Environment and Natural Resources Division of Air Quality. Air Quality Rules & Regulations. Retrieved from: <http://deq.nc.gov/about/divisions/air-quality/air-quality-rules>.
- NC DEQ 2015a. North Carolina Department of Environmental Quality. Division of Air Quality Permit No. 03743R22 - Seymour Johnson Air Force Base.
- NC DEQ 2015b. North Carolina Department of Environmental Quality. *State of North Carolina Division of Waste Management Hazardous Waste Management Permit, Seymour Johnson Air Force Base Permit*, United States Air Force, 4th Fighter Wing, Seymour Johnson Air Force Base, North Carolina. 24 September 2015.
- NC DOT 2014. North Carolina Department of Transportation. North Carolina Average Daily Traffic Map. Retrieved from: https://xfer.services.ncdot.gov/imgdot/DOTTSUMaps/AADT_URBANS/GOLDSBORO_URBAN/2014/Goldsboro.pdf on 15 April 2016.
- NC Report Card 2016. NC Report Cards. Query for Wayne County Public School District, Meadow Lane Elementary, Greenwood Middle School, and Eastern Wayne High School. Available online at <http://www.ncreportcards.org/src>.
- NCWRC 2014. North Carolina Wildlife Resources Commission. Protected Wildlife Species of North Carolina. Retrieved from: http://www.ncwildlife.org/Portals/0/Conserving/documents/protected_species.pdf on 25 March 2016
- North Carolina Watersheds 2007. Neuse River Basin Watershed. Retrieved from: http://www.carolana.com/NC/Transportation/nc_watersheds.html
- NRCS 2007. Natural Resources Conservation Service. Rapid Watershed Assessment Upper Wabash Watershed (HUC 05120101).
- ODEQ 2004. Oklahoma Department of Environmental Quality. Letter from Jim Kromer to Roger Ward. Regarding Requested Copies of Permit for Southeast Landfill Permit #3555028. February 23, 2004.
- ODEQ 2014a. Oklahoma Department of Environmental Quality. *2013 Air Emissions Inventory Turn Around Document - Midwest City Air Depot (Tinker Air Force Base)*.
- ODEQ 2014b. Oklahoma Department of Environmental Quality, Air Quality Division. Title V Permit No. 2009-394-TVR – Tinker Air Force Base.
- ODEQ 2016. Oklahoma Department of Environmental Quality. Water Quality Division. Integrated Water Quality Assessment [305(b)/303(d)] Retrieved from: http://www.deq.state.ok.us/WQDNew/305b_303d/index.html.
- ODWC 2005. Oklahoma Department of Environmental Quality. Oklahoma Comprehensive Wildlife Conservation Strategy. Approved by the USFWS on 12 October 2005. <http://www.wildlifedepartment.com/cwcs.htm>.

- ODWC 2011a. Oklahoma Department of Wildlife Conservation. Threatened, Endangered, and Rare Species. Whooping Crane (*Grus americana*). Retrieved from: <http://www.wildlifedepartment.com/wildlifemgmt/endangered/crane.htm> on 21 January 2016.
- ODWC 2011b. Oklahoma Department of Wildlife Conservation. Threatened, Endangered, and Rare Species. Piping plover (*Charadrius melodus*). Retrieved from: <http://www.wildlifedepartment.com/wildlifemgmt/endangered/plover.htm> 21 January 2016.
- ODWC 2011c. Oklahoma Department of Wildlife Conservation. Threatened, Endangered, and Rare Species. Interior Least Tern (*Sterna antillarum*). Retrieved from: http://www.wildlifedepartment.com/wildlifemgmt/endangered/least_tern.htm 21 January 2016.
- ODWC 2011d. Oklahoma Department of Wildlife Conservation. Threatened, Endangered, and Rare Species. ODWC 2011d. Arkansas River Shiner (*Notropis girardi*). Retrieved from: http://www.wildlifedepartment.com/wildlifemgmt/endangered/river_shiner.htm on 21 January 2016.
- OFS 2013. Oklahoma Forestry Service. The Ecoregions of Oklahoma. Retrieved from: <http://www.forestry.ok.gov/ecoregions-of-oklahoma> on 6 April 2016.
- OKDOE 2016a. Oklahoma Department of Education. “FY 15/16 Oklahoma Public School District Enrollment Totals.”
- OKDOE 2016b. Oklahoma Department of Education. “A-F Report Card: 2014-2015.” Query for Steed Elementary School and Willow Brook Elementary School. Retrieved from: <http://afreportcards.ok.gov> on 29 March 2016.
- OKDOT 2014. Oklahoma Department of Transportation. Oklahoma Average Daily Traffic Map. Retrieved from: <http://www.okladot.state.ok.us/Maps/aadt/2014/55-Oklahoma.pdf>, on 15 April 2016.
- Oklahoma County 2004. Oklahoma County, Oklahoma Emergency Management. Retrieved from: <http://www.oklahomacounty.org/emergencymanagement/Default2.htm> 6 April 2016.
- Owen, Douglas 2016. Email communication from Douglas Owen (4 CES/CEOER) to Cathy Pesenti (4 CES/CEIEA) regarding ACM, LBP, and PCBs at Seymour Johnson AFB, North Carolina. 28 April 2016. KC-46A MOB 3 Beddown EIS.
- OWRB 2015. Oklahoma Water Resources Board. Oklahoma Water Quality Standards (OWQS). Retrieved from: <https://www.owrb.ok.gov/quality/standards/standards.php>
- Schultz, Theodore 1978. Synthesis of Social Surveys on Noise Annoyance. Journal of the Acoustical Society of America. 64(2). August 1978.
- Seymour Johnson AFB 1997. Seymour Johnson Air Force Base. *Asbestos Operating Plan* (AOP), Department of the Air Force, Air Combat Command, 4th Fighter Wing, Seymour Johnson Air Force Base, North Carolina. April 1997.
- Seymour Johnson AFB 2008. Seymour Johnson Air Force Base. *General Plan*. September 2008.
- Seymour Johnson AFB 2014a. Seymour Johnson Air Force Base. *Natural Infrastructure Assessment* (NIA). Seymour Johnson Air Force Base. January 2014.
- Seymour Johnson AFB 2014b. Seymour Johnson Air Force Base. *Spill Prevention, Control, and Countermeasures Plan* (SPCC), Seymour Johnson Air Force Base, North Carolina. December 2014.

- Seymour Johnson AFB 2014c. Seymour Johnson Air Force Base. *Installation Emergency Management Plan (IEMP) 10-2*, Department of the Air Force, 4th Fighter Wing (ACC), Seymour Johnson Air Force Base, North Carolina, 27531. 5 May 2014.
- Seymour Johnson AFB 2015a. Seymour Johnson Air Force Base. Goldsboro, North Carolina and Fort Fisher Recreation Area, Kure Beach, North Carolina. *Integrated Natural Resource Management Plan (INRMP)*. April 2015.
- Seymour Johnson AFB 2015b. Seymour Johnson Air Force Base. Seymour Johnson Air Force Base Goldsboro, North Carolina. *Bird Aircraft Strike Hazard (BASH) Plan*. February.
- Seymour Johnson AFB 2015c. Seymour Johnson Air Force Base. Environmental Assessment U.S. Air Force Reserve Command Proposed Military Construction Project Seymour Johnson Air Force Base Goldsboro, North Carolina. August 2015.
- Seymour Johnson AFB 2015d. Seymour Johnson Air Force Base. *Stormwater Plan (SWP)*. January 2015.
- Seymour Johnson AFB 2015e. Seymour Johnson Air Force Base. “Seymour Johnson AFB impacts local economy.” Published 14 December 2015.
- Seymour Johnson AFB 2015f. Seymour Johnson Air Force Base. *Hazardous Waste Management Plan (HWMP)*, 4th Fighter Wing, Seymour Johnson Air Force Base, North Carolina. June 2004. Updated February 2015.
- Seymour Johnson AFB 2016. Seymour Johnson Air Force Base. *Management Action Plan, (MAP)* Seymour Johnson Air Force Base, North Carolina. 28 April 2016.
- St. Germain, M. J. 2010. Inventory of Avian Species on Tinker Air Force Base (AFB) Oklahoma City, Oklahoma. Conservation Management Institute, Virginia Polytechnic Institute and State University, College of Natural Resources and Environment, Blacksburg, Virginia.
- Teske, M.E. and Curbishley, T.B. 2000. Fuel Jettison Simulation Model User Manual, Version 2.0, Continuum Dynamics, Inc., Princeton, NJ.
- Tinker AFB 2003. Tinker Air Force Base. *Integrated Solid Waste Management Plan (SWMP)*. U.S. Air Force Center of Environmental Excellence. Brooks Air Force Base, Texas. January 2003.
- Tinker AFB 2005. Tinker Air Force Base. Tinker Air Force Base. General Plan, Tinker Air Force Base Oklahoma. 72D Air Base Wing (AFMC). Tinker Air Force Base, Oklahoma. August 2005.
- Tinker AFB 2007. Tinker Air Force Base. *Oil and Hazardous Substance Integrated Contingency Plan*, Tinker Air Force Base, Oklahoma. 26 October 2007.
- Tinker AFB 2010. Tinker Air Force Base. *Lead Based Paint Management Plan*, Tinker Air Force Base, Environmental Compliance Branch, Oklahoma. February 2010.
- Tinker AFB 2011. Tinker Air Force Base. *Integrated Cultural Resources Management Plan for Tinker Air Force Base, Oklahoma City, Oklahoma*. 72d Air Base Wing. May 2011.
- Tinker AFB 2012. Tinker Air Force Base. *Asbestos Management Plan*, Tinker Air Force Base, Oklahoma. February 2012.

- Tinker AFB 2014a. Tinker Air Force Base. Annual Revision of Tinker Air Force Base Plan 91-212, *Bird/Wildlife-Aircraft Strike Hazard (BASH) Plan* (Tinker Air Force Base Plan 91-212). Headquarters 72D Air Base Wing. Tinker Air Force Base Oklahoma. February.
- Tinker AFB 2014b. Tinker Air Force Base. *Storm Water Pollution Prevention Plan (SWPP)*. 72D Air Base Wing Tinker Air Force Base, Oklahoma. August 2014.
- Tinker AFB 2015a. Tinker Air Force Base. *Integrated Natural Resources Management Plan (INRMP)*. Civil Engineering Directorate, 72 ABW/CEIEC, Tinker Air Force Base, Oklahoma.
- Tinker AFB 2015b. Tinker Air Force Base. *Tinker Air Force Instruction 32-7004, Hazardous Waste Management*, Tinker Air Force Base, Oklahoma. Originally dated 4 March 2011. Certified current on 1 October 2015.
- Tinker AFB 2015c. Tinker Air Force Base. Site Survey Questionnaire. April 2015.
- Tinker AFB 2016. Tinker Air Force Base. "Welcome to Tinker AFB." Retrieved from: <http://www.tinker.af.mil/main/welcome.asp> on 4 April 2016.
- Unterreiner, Gerald, A. 2007. Bedrock Aquifer System of Miami County. Indiana Department of Natural Resources; Division of Water Resource Assessment Section.
- U.S. 31 Coalition 2016. Retrieved from: <http://www.us31coalition.com/> on 10 May 2016
- USACE 2012. U.S. Army Corps of Engineers. KC-46A Master Planning Study, Final Study, Tinker AFB, OK. Prepared by Burns & McDonnell. April 2012.
- USACE 2013. U.S. Army Corps of Engineers. KC-46A Depot Maintenance Activation. Tinker Air Force Base, Oklahoma City, Oklahoma. Hydrology and Hydraulic Report. Analysis of Effects of Development To Support the Environmental Assessment. USACE. August 2013.
- USACE 2016. U.S. Army Corps of Engineers. Department of the Army Corps of Engineers, Tulsa District. Memorandum for 72 ABW/CEIEC. Subject: Section 404 Jurisdictional Determination for area between 507th Ramp and Outfall 009; Identification Number SWT-2016-199. Jurisdictional Determination (JD) letter dated 30 March 2016.
- USAF 2004. Storm Water Capacity Analysis at Grissom Air Reserve Base, Indiana. November 2004.
- USAF 2006. U.S. Air Force. Air Installation Compatible Use Zone Study (AICUZ). Tinker Air Force Base, Oklahoma. December 2006.
- USAF 2007. U.S. Air Force. USAF General Plan and Installation Summary for Tinker Air Force Base. 17 July 2007.
- USAF 2009. U.S. Air Force. Air Force Instruction 32-7042, Waste Management, 15 April 2009
- USAF 2011. U.S. Air Force. Air Installation Compatible Use Zone Study (AICUZ) Update. Seymour Johnson Air Force Base, North Carolina. December 2011.
- USAF 2013a. U.S. Air Force. Air Installation Compatible Use Zone Study (AICUZ). Westover Air Reserve Base, Massachusetts. February 2013.
- USAF 2013b. *Air Force FY2012 Implementation Plan for the DoD Strategic Sustainability Performance Plan 2012 Report*. Available online at <http://www.safie.hq.af.mil/shared/media/document/AFD-121211-038.pdf>.

- USAF 2013c. *U.S. Air Force Energy Strategic Plan*. Available online at <http://www.safie.hq.af.mil/shared/media/document/AFD-130325-124.pdf>.
- USAF 2014a. U.S. Air Force. Guide for Environmental Justice Analysis Under the Environmental Impact Analysis Process (EIAP). November 2014.
- USAF 2014b. U.S. Air Force. Air Installation Compatible Use Zone Study (AICUZ). Grissom Air Reserve Base, Indiana. December 2014.
- USAF 2014c. U.S. Air Force. Environmental Assessment KC-46A Depot Maintenance Activation Tinker Air Force Base, Oklahoma. USAF 72 Air Base Wing Tinker Air Force Base, Oklahoma. March 2014.
- USAF 2015a. U.S. Air Force. Final Environmental Assessment Westover Air Reserve Base, Chicopee, Massachusetts, Manage Airfield Vegetation to Protect Flight Safety. April 2015.
- USAF 2015b. U.S. Air Force. Main Operating Base (MOB) 3 KC-46A Beddown Grissom ARB, IN 11-15 May 2015.
- USAF 2015c. U.S. Air Force. Main Operating Base (MOB) 3 KC-46A Beddown Seymour-Johnson AFB, NC 8-12 June 2015.
- USAF 2015d. U.S. Air Force. Main Operating Base (MOB) 3 KC-46A Beddown Tinker AFB, OK 18-21 May 2015.
- USAF 2015e. U.S. Air Force. Main Operating Base (MOB) 3 KC-46A Beddown Westover ARB, MA 1-5 June 2015.
- USAF 2015f. U.S. Air Force. *U.S. Air Force Hazardous Waste Management Plan*, Westover Air Force Base, Chicopee, Massachusetts. 6 November 2015.
- USAF 2016. U.S. Air Force. “Air Force Housing.” Retrieved from: <http://www.housing.af.mil/seymourjohnson/> on 28 March 2016.
- USCB 2010. U.S. Census Bureau. “Profile of General Population and Housing Characteristics: 2010.” 2010 Census. Query for: Cass County, Indiana; Miami County, Indiana; Logansport City, Indiana, Peru City, Indiana, Goldsboro City, North Carolina; Wayne County, North Carolina; North Carolina; Oklahoma City, Oklahoma; Oklahoma County, Oklahoma; Oklahoma; Amherst town, Massachusetts; Springfield City, Massachusetts; Hampden County, Massachusetts; and Hampshire County, Massachusetts.
- USCB 2014a. U.S. Census Bureau. “ACS Demographic and Housing Estimates.” 2010-2014 American Community Survey 5-Year Estimates. Query for: Cass County, Indiana; Miami County, Indiana; Logansport City, Indiana, Peru City, Indiana, State of Indiana, United States, Goldsboro City, North Carolina; Wayne County, North Carolina; North Carolina; Oklahoma City, Oklahoma; Oklahoma County, Oklahoma; Oklahoma; Amherst town, Massachusetts; Springfield City, Massachusetts; Hampden County, Massachusetts; Hampshire County, Massachusetts; and Massachusetts.
- USCB 2014b. U.S. Census Bureau. “Selected Housing Characteristics.” 2010-2014 American Community Survey 5-Year Estimates. Query for: Cass County, Indiana; Miami County, Indiana; Wayne County, North Carolina; Oklahoma County, Oklahoma; Hampden County, Massachusetts; and Hampshire County, Massachusetts.

- USCB 2014c. U.S. Census Bureau. *“Selected Economic Characteristics.” 2010-2014 American Community Survey 5-Year Estimates. Query for: Cass County, Indiana; Miami County, Indiana; State of Indiana; United States; Wayne County, North Carolina; North Carolina; Oklahoma County, Oklahoma; Oklahoma; Hampden County, Massachusetts; Hampshire County, Massachusetts; and Massachusetts.*
- USD 2009. Under Secretary of Defense. Memorandum from the Under Secretary of Defense, Ashton B. Carter, re: “Methodology for Assessing Hearing Loss Risk and Impacts in DoD Environmental Impact Analysis,” 16 June 2009.
- USDA 1975. U.S. Department of Agriculture. Soil Survey of Hampden County, Massachusetts Central Part. Soil Conservation Service.
- USEIA 2014. U.S. Energy Information Administration Average monthly residential electricity consumption, prices, and bills by state, Retrieved from: <https://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3> on 20 April 2016.
- USEIA 2016. U.S. Energy Information Administration. U.S. Energy Information Administration 2016. Natural Gas Summary, Retrieved from https://www.eia.gov/dnav/ng/ng_sum_lsum_a_EPG0_vrs_mmc_f_a.htm on 20 April 2016.
- USEPA 1974. U.S. Environmental Protection Agency. Information on Levels of Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety. EPA 550/9-74-004. March.
- USEPA 1995. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, AP-42, Volume I. Section 13.2.3, Heavy Construction Operations. Retrieved from: <http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf>.
- USEPA 2009a. U.S. Environmental Protection Agency. NONROAD Model (nonroad engines, equipment, and vehicles) 2008 Model. Retrieved from: <http://www.epa.gov/otaq/nonrdmdl.htm>.
- USEPA 2009b. U.S. Environmental Protection Agency. U.S. Environmental Protection Agency. Estimating 2003 Building-Related Construction and Demolition Materials Amounts. March 2009.
- USEPA 2014. U.S. Environmental Protection Agency. Guide for Estimating Infiltration and Inflow. Retrieved from: <https://www3.epa.gov/region1/sso/pdfs/Guide4EstimatingInfiltrationInflow.pdf>, on 15 April 2016.
- USEPA 2015a. U.S. Environmental Protection Agency. Federal Register / Vol. 80, No. 44 / Friday, March 6, 2015 / Rules and Regulations - ENVIRONMENTAL PROTECTION AGENCY - 40 CFR Parts 50, 51, 52, 70, and 71 [EPA-HQ-OAR-2010-0885; FRL-9917-29-OAR] - RIN 2060-AR34 - Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements – Final Rule.
- USEPA 2015b. U.S. Environmental Protection Agency. Motor Vehicle Emission Simulator (MOVES). Retrieved from: <https://www3.epa.gov/otaq/models/moves/>.
- USEPA 2016a. Green Book Nonattainment Areas. Retrieved from: <https://www3.epa.gov/airquality/greenbk/index.html>.
- USEPA 2016b. U.S. Environmental Protection Agency. 2011 National Emissions Inventory (NEI) Data. Retrieved from: <https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data>.

- USFS 2016. U.S. Forest Service. American Peregrine Falcon (*Falco peregrinus*). Retrieved from: <http://www.fs.fed.us/database/feis/animals/bird/fape/all.html> on 21 January 2016.
- USFWS 1998. U.S. Fish and Wildlife Service. Endangered Species Consultation Handbook, Procedures for Conducting Consultation and Conferences, Final. March 1998.
- USFWS 2002. U.S. Fish and Wildlife Service. Raleigh Field Office. USFWS Section 7 Response Letter to Seymour Johnson Air Force Base dated 6 September 2002. Survey report entitled “*Potential for Red-cockaded Woodpecker (Picoides borealis; RCW) and Its Habitat on Seymour Johnson Air Force Base, North Carolina.*” Surveys did not detect RCW activity at Seymour Johnson Air Force Base, North Carolina. USFWS issued concurrence that the RCW is unlikely to become established on Seymour Johnson Air Force Base.
- USFWS 2008. U.S. Fish and Wildlife Service. Species Profile: Red-cockaded Woodpecker (*Picoides borealis*) Retrieved from: <https://www.fws.gov/endangered/esalibrary/pdf/woodpecker.pdf>.
- USFWS 2011a. U.S. Fish and Wildlife Service. Endangered Species. Piping Plover (*Charadrius melodus*) Fact Sheet. Retrieved from: <https://www.fws.gov/midwest/endangered/pipingplover/pdf/piplfactsheet.pdf> 28 April 2016.
- USFWS 2011b. U.S. Fish and Wildlife Service. Endangered Species. Arkansas River Shiner (*Notropis girardi*) Fact Sheet. Retrieved from: http://www.fws.gov/southwest/es/oklahoma/Documents/TE_Species/Species%20Profiles/AR%20River%20Shiner.pdf on 27 April 2016.
- USFWS 2014a. U.S. Fish and Wildlife Service. Rufa Red Knot Background Information and Threat Assessment. Supplement to Endangered and Threatened Wildlife and Plants; Final Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*). Docket No. FWS–R5–ES–2013–0097; RIN AY17. Retrieved from: http://www.fws.gov/northeast/redknot/pdf/20141125_REKN_FL_supplemental_doc_FINAL.pdf on 21 January 2016.
- USFWS 2014b. U.S. Fish and Wildlife Service. Species Status and Fact Sheet Whooping crane (*Grus Americana*). Retrieved from: <http://www.fws.gov/northflorida/whoopingcrane/whoopingcrane-fact-2001.htm> on 22 January 2016.
- USFWS 2015a. U.S. Fish and Wildlife Service. Critical Habitat Portal. Retrieved from: <http://ecos.fws.gov/crithab/> on 13 January 2016.
- USFWS 2015b. U.S. Fish and Wildlife Service. Raleigh Ecological Field Office. Species Profile: Dwarf wedgemussel (*Alasmodonta heterodon*) Retrieved from: http://www.fws.gov/raleigh/species/es_dwarf_wedgemussel.html on 19 January 2016.
- USFWS 2015c. U.S. Fish and Wildlife Service. Raleigh Ecological Field Office. Species Profile: Rabbitsfoot (*Quadrula cylindrica cylindrica*). Retrieved from: <http://www.fws.gov/midwest/Endangered/clams/rabbitsfoot/index.html> on 19 January 2016.
- USFWS 2015d. U.S. Fish and Wildlife Service. Endangered Species. Northern Long-Eared Bat (*Myotis septentrionalis*). Fact Sheet. Retrieved from: <http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html> on 19 January 2016.
- USFWS 2015e. U.S. Fish and Wildlife Service. Endangered Species. Indiana Bat (*Myotis sodalis*). Retrieved from: <http://www.fws.gov/MIDWEST/endangered/mammals/inba/index.html> on 19 January 2016.

- USFWS 2015f. U.S. Fish and Wildlife Service. Endangered Species. Small Whorled Pogonia (*Isotria medeoloides*) Fact Sheet. Retrieved from: <http://www.fws.gov/midwest/endangered/plants/smallwhorledpogoniafs.html> on 19 January 2016.
- USFWS 2015g. U.S. Fish and Wildlife Service. Endangered Species. Sheepnose Mussel (*Plethobasus cyphus*). Retrieved from: <http://www.fws.gov/Midwest/endangered/clams/sheepnose/index.html> on 21 January 2016.
- USFWS 2015h. U.S. Fish and Wildlife Service. Endangered Species – Ecological Services. Special-Status Species Known to or Believed to Occur in Wayne County, North Carolina. Retrieved from: <https://www.fws.gov/endangered/> on 13 January 2016.
- USFWS 2015i. U.S. Fish and Wildlife Service. Endangered Species – Ecological Services. Special-Status Species Known to or Believed to Occur in Oklahoma County, Oklahoma. Retrieved from: <https://www.fws.gov/endangered/> on 13 January 2016.
- USFWS 2015j. U.S. Fish and Wildlife Service. Special-Status Species Known to or Believed to Occur in Hampden County, Massachusetts. Endangered Species – Ecological Services. Retrieved from: <https://www.fws.gov/endangered/> on 13 January 2016.
- USFWS 2016a. U.S. Fish and Wildlife Service. Bloomington Field Office (ES). USFWS Section 7 Response Letter to Grissom Air Reserve Base dated 15 April 2016. Project: Third Main Operating Base (MOB 3) of KC-46A Tanker Aircraft. Location: Grissom Air Reserve Base, Miami and Cass Counties, Indiana. Subject: Special Status Species.
- USFWS 2016b. U.S. Fish and Wildlife Service. USFWS Information for Planning and Conservation (IPaC) Online System. Cass and Miami Counties, Indiana. Retrieved from: <https://ecos.fws.gov/ipac/project/KGW6DBT2HVGJLPMZI7DLB4WWOM/resources> on 13 January 2016.
- USFWS 2016c. U.S. Fish and Wildlife Service. USFWS Environmental Conservation Online System. Species by County Reports. Special-Status Species Known to or Believed to Occur in Cass and Miami Counties, Indiana. Retrieved from: http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=18017 and http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=18103 on 13 January 2016.
- USFWS 2016d. U.S. Fish and Wildlife Service. U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) Online System. Wayne County, North Carolina. Retrieved from: <https://ecos.fws.gov/ipac/project/MSRW7UORLFHTTFDCWU2CUD6NRY/resources> on 13 January 2016.
- USFWS 2016e. U.S. Fish and Wildlife Service. USFWS Information for Planning and Conservation (IPaC) Online System. Oklahoma County, Oklahoma. Retrieved from: <https://ecos.fws.gov/ipac/project/OG7U256FZJBULPVM6ULXGACIRA/resources> on 13 January 2016.
- USFWS 2016f. U.S. Fish and Wildlife Service. USFWS Information for Planning and Conservation (IPaC) Online System. Hampden County, Massachusetts. Retrieved from: <https://ecos.fws.gov/ipac/project/QZIQYV3DNJHAFPJWDX2A3ACVEU/resources> on 13 January 2016.

- USFWS 2016g. U.S. Fish and Wildlife Service. USFWS Oklahoma Ecological Services Field Office (OKEFSO). USFWS Section 7 Response Comment to Tinker Air Force Base dated 5 May 2016. Project: Third Main Operating Base (MOB 3) of KC-46A Tanker Aircraft. Location: Grissom Air Reserve Base, Miami and Cass Counties, Indiana. Subject: Special Status Species.
- USGCRP 2014. United States Global Change Research Program. *Climate Change Impacts in the United States - The Third National Climate Assessment*. Retrieved from: <http://nca2014.globalchange.gov/>, 31 March 2016.
- USGS 1997. U.S. Geological Survey. Hydrogeologic Framework and Ground-Water Resources at Seymour Johnson Air Force Base, North Carolina. USGS Reference 96-581.
- USGS 2013. Groundwater Atlas of the United States, Oklahoma and Texas, HA 730-E. Retrieved from: http://pubs.usgs.gov/ha/ha730/ch_e/E-text9.html on 30 January 2013.
- USGS 2016. U.S. Geological Survey. Oklahoma Water Science Center. Central Oklahoma (Garber-Wellington) Aquifer Study. Retrieved from: <http://ok.water.usgs.gov/projects/coa/>.
- Walters, Cory 2015. Personal communication from Cory Walters (434 MSG/CEV) via meeting with Leidos Team Site Visit regarding environmental concerns at Grissom ARB. 8 December 2015. KC-46A MOB 3 Beddown EIS.
- Ware, Michael 2016. Personal Communication between Mr. Michael Ware, USACE, Tulsa District and Brian Tutterow, Leidos via phone conversation on potential Nationwide Permitting at Tinker AFB 13 June 2016.
- Wayne County 2016. Wayne County, North Carolina Office of Emergency Services. Retrieved from: <http://www.waynegov.com/312/Office-of-Emergency-Services> on 7 April 2016.
- Weaver Boos Consultants, LLC-Southwest 2011. Southeast Landfill Oklahoma City, Oklahoma. Planned Unit Development Application. WBC Project No. 0120-75-11-125-01. Oklahoma City Landfill, LLC July 2011.
- Westover ARB 1995. Westover Air Reserve Base. *Integrated Natural Resources Management Plan (INRMP)*. Prepared for Westover ARB by Stone and Webster Environmental Technology and Services and LAW Engineering and Environmental Services. Chicopee, Massachusetts. August 1995.
- Westover ARB 2004a. Westover Air Reserve Base. *Integrated Cultural Resources Management Plan (ICRMP)*. 439th Airlift Wing. Westover Air Reserve Base, OK. September 2004, Revised 2008.
- Westover ARB 2004b. Westover Air Reserve Base. *Westover Air Reserve Base/ Westover Metropolitan Airport Joint Land Use Study (JLUS) Update*. October 2004.
- Westover ARB 2011. Westover Air Reserve Base. *Hazardous Materials Emergency Planning and Response (HAZMAT) Plan for Westover Air Reserve Base*, 439 MSG/CEV, Westover Air Reserve Base, Chicopee, Massachusetts. April 2011.
- Westover ARB 2013a. Westover Air Reserve Base. *Asbestos Management Plan*, Air Force Reserve Command, 439th Airlift Wing, Westover Air Reserve Base, Chicopee, Massachusetts. 13 March 2013.

- Westover ARB 2013b. Westover Air Reserve Base. *Lead-Based Paint Management Plan*, Air Force Reserve Command, 439th Airlift Wing, Westover Air Reserve Base, Chicopee, Massachusetts. 13 March 2013.
- Westover ARB 2014a. Westover Air Reserve Base. *Draft Integrated Natural Resources Management Plan (INRMP)*. Westover ARB, Massachusetts. Headquarters, Air Force Reserve Command Environmental Division. April 2005.
- Westover ARB 2014b. Westover Air Reserve Base. *Bird/Wildlife Aircraft Strike Hazard (BASH) Program*. 439th Airlift Wing (AFRC) Westover ARB MA 01022-1850.
- Westover ARB 2014c. Westover Air Reserve Base. *Westover Air Reserve Base Installation Development Plan (IDP)*. 439th Airlift Wing. Westover Air Reserve Base, Massachusetts 439th Airlift Wing.
- Westover ARB 2015a. Westover Air Reserve Base. *Air Emissions Report – 2013 Yearly Calculations - Emission Summary for Selected Activities*. Westover Air Reserve Base, Massachusetts 439th Airlift Wing.
- Westover ARB 2015b. Westover Air Reserve Base. *2014 GHG Submission Report to the Massachusetts Energy and Environmental Affairs (Mass DEP)*. Westover Air Reserve Base, Massachusetts 439th Airlift Wing.
- Westover ARB 2015c. “Westover pumped more than \$221M into local economy in fiscal 2015.” Published 22 October 2015. Westover Air Reserve Base, Massachusetts 439th Airlift Wing.
- Westover ARB 2015d. *Integrated Solid Waste Management Plan (ISWMP)* for Westover Air Reserve Base. Headquarters Air Force Reserve Command HQ AFRC/CEVQ, Robins Air Force Base, Georgia. August 2015.
- Westover ARB 2015e. Westover Air Reserve Base. 439 AW Westover ARB Bird Strike Counts (Past 5 Years). April.
- Westover ARB 2015f. Westover Air Reserve Base. *Westover ARB Storm Water Pollution Prevention Plan (SWPPP)*. Revised by 439th MSG/CEV. Westover Air Reserve Base, Massachusetts 439th Airlift Wing. August 2015.
- Westover ARB 2015g. Westover Air Reserve Base. *Westover Air Reserve Base Restoration Management Action Plan (MAP)*. Westover Air Reserve Base, Chicopee, Massachusetts. 28 April 2015.
- Westover ARB 2015h. Westover Air Reserve Base. *Addendum to the National Register Determination of Eligibility*. Westover Air Reserve Base, Massachusetts 439th Airlift Wing. December 14.
- Westover ARB 2015i. Westover Air Reserve Base. Utility Spreadsheet from 2010-2014. November.
- Whitaker, John O. and Charles Amlaner Jr. 2012. *Habitats and Ecological Communities of Indiana. Presettlement to Present*. Indiana University Press, Bloomington and Indianapolis.

- Winner, M.D., Jr., and Lyke, W.L. 1986, History of groundwater pumpage and water-level decline in the Black Creek and upper Cape Fear aquifers of the central Coastal Plain of North Carolina: U.S. Geological Survey Water-Resources Investigations Report 86-4168, 21 p.
- Woodring, Jeff 2016a. Personal Communication from Mr. Jeff Woodring (434 MSG/CEV) to Leidos regarding tons of material transported to landfills. 2 June 2016.
- Woodring, Jeff 2016b. Email communication from Mr. Jeff Woodring (434 MSG/CEV) to Leidos regarding hazardous waste at Grissom ARB, Indiana. 27 April 2016. KC-46A MOB 3 Beddown EIS.
- Young, Dwight 2011. Email communication from Dwight Young (4 CES/CEOF) to Cathy Pesenti (4 CES/CEA) regarding PCBs at Seymour Johnson AFB. North Carolina, 7 January 2011. KC-46A MOB 3 Beddown EIS.
- Zapata Inc. and URS Group, Inc. 2015. CY2014 Air Emissions Inventory - Air Program Information Management System - Seymour Johnson Air Force Base, North Carolina.

PUBLIC DOCUMENTS

Air Force

AFMAN 32-1084 – Facility Requirements

Air Force Instructions

AFI 10-503 – Strategic Basing

AFI 32-1052 – Facility Asbestos Management

AFI 32-7042 – Solid and Hazardous Waste Compliance

AFI 32-7061 – The Environmental Impact Analysis Process 12 March 2003

AFI 32-7063 – AICUZ Program

AFI 32-7064 – Integrated Natural Resources Management

AFI 32-7086 – Hazardous Material Management

AFI 90-1001 – Responsibilities for Total Force Integration

AFI 91-202 – The U.S. Air Force Mishap Prevention Program. 24 June 2015 with guidance changes 16 February 2016.

Code of Federal Regulations

32 *CFR* 989 – Environmental Impact Analysis Process

32 *CFR* 989.22(d) – Mitigation

36 *CFR* 800 – Protection of Historic Properties (incorporating amendments effective August 5, 2004)

36 *CFR* 800.2 – Participants in the Section 106 process

40 *CFR* 61.145 – Standard for Demolition and Renovation

40 *CFR* 112 – Oil Pollution Prevention

40 *CFR* 112.20(f) – Certification of Applicability of Substantial Harm Criteria

40 *CFR* 1500-1518 – Council on Environmental Quality

40 *CFR* 1502.14(d) – Alternatives Including the Proposed Action

40 *CFR* §1503.4 – Response to Comments

40 *CFR* 1508.2 – Mitigation

Department of Defense Instructions

DoDI 4710.02 – Department of Defense Interactions with Federally-Recognized Tribes

DoDI 4710.03– Consultation with Native Hawaiian Organizations (NHOs)

Environmental Protection Agency Documents

AP-42 – Compilation of Air Pollutant Emission Factors

Executive Orders

EO 11988 – Floodplain Management

EO 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 13045 – Protection of Children from Environmental Health Risks and Safety Risks

EO 13175 – Consultation and Coordination with Indian Tribal Governments

EO 13690 – Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input

Legislative Resolutions

H.R. 933 – Consolidated and Further Continuing Appropriations Act, 2013

H.R. 1735 – National Defense Authorization Act For Fiscal Year 2016

H.R. 3304 – National Defense Authorization Act for Fiscal Year 2014

H.R. 4435 – Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015

Unified Facilities Criteria

UFC 3-101-01 – Architecture

UFC 3-210-10 – Low Impact Development

UFC 3-230-03 – Water Treatment 1 November 2012

United States Code

42 *USC* 7401–7671(q) – Clean Air Act

42 *USC* §17094 – Storm water runoff requirements for Federal development projects

LIST OF PREPARERS ———



LIST OF PREPARERS

Government Agency Development Team			
Name/Title		Role	
Air Force Civil Engineer Center (AFCEC)		Environmental Planning Function (EPF)/Lead Environmental Impact Statement (EIS) Development	
Air Force Reserve Command (AFRC)		Proponent	
Air Mobility Command (AMC)		Lead Command	
Contractor Development Team			
Name/Title	Project Role	Subject Area	Qualifications
Jay Austin Noise Analyst M.S. Environmental Science B.A. Biology	Section Author	Acoustic Environment	12 years environmental science
Matthew Bange, PE Environmental Engineer B.S. Biological Engineering	Section Author	Infrastructure	11 years environmental science
Chris Crabtree Air Quality Meteorologist B.A. Environmental Studies	Section Author	Air Quality	25 years environmental science
Tom Daves, PMP Biologist M.S. Natural Resources B.S. Biology	Project Manager, Editor	Water Resources	23 years environmental science
Mike Deacon Environmental Scientist B.S. Environmental Studies B.S. Environmental Health	Section Author	Land Use	23 years environmental science
Denise DeLancey Electronic Publishing Specialist B.A. English/Communications	Production	Document Production	17 years document production
Dave Dischner Senior Environmental Analyst B.A. Urban Affairs	Quality Assurance/ Quality Control and Section Author	Quality Assurance/ Quality Control, Safety and Land Use	37 years environmental science
Anthony Finley Electronic Publishing Specialist B.A. English	Production	Document Production	8 years document production
Heather Gordon GIS Specialist M.S. Geography B.A. Environmental Studies	Figures	Geographic Information System (GIS)	16 years environmental science; GIS applications
Lorraine Gross Archaeologist M.A. Anthropology B.A. Anthropology	Section Author	Cultural Resources	28 years environmental science
Nathan Gross, CHMM Environmental Scientist B.S. Wildlife and Fisheries Management	Section Author	Hazardous Materials and Waste, Project Support	15 years environmental science

LIST OF PREPARERS (Continued)

Contractor Development Team			
Name/Title	Project Role	Subject Area	Qualifications
Pamela McCarty Economist M.S. Industrial and Systems Engineering M.A. Applied Economics/Economics B.S. Business Administration/Economics	Section Author	Socioeconomics; Environmental Justice and other Sensitive Receptors	7 years environmental science
Sarah Rauch Conservation Ecologist B.S. Plant Biology, Environmental Science and Ecology	Section Author	Biological Resources	9 years environmental science
Brian Tutterow Environmental Scientist B.S. Biology	Section Author	Cultural Resources	18 years environmental science
Sarah Willis B.A. Fine Arts	Production	Document Production	4 years document production
Earl Allbright Senior Environmental Scientist B.S. Industrial Engineering	Quality Assurance/ Quality Control	Land Use/Safety	33 years environmental science
Louis Diaz Environmental Engineer M.A. Engineering B.A. Aerospace Engineering	Quality Assurance/ Quality Control	Infrastructure	20 years environmental engineering
Dr. Karen Foster Ph.D. Anthropology M.A. Anthropology B.A. Anthropology	Quality Assurance/ Quality Control	Acoustic Environment	20 years anthropology
Catrina Gomez Senior Environmental Planner M.A. Environmental Science B.A. Biological Science	Quality Assurance/ Quality Control	Land Use	17 years environmental science
Matthew Milligan Air Quality Specialist B. A. Environmental Science B.A. Meteorology	Quality Assurance/ Quality Control	Air Quality	12 years environmental engineering
Trevor Pattison Environmental Science and Engineering B.A. Geology	Quality Assurance/ Quality Control	Biological Resources	17 years environmental science and engineering
Perry Russell Senior Geologist M.A. Geology B.A. Geology	Quality Assurance/ Quality Control	Hazardous Materials	19 years geology, water resources, hazardous materials, and public safety
Robert Van Tassel Quality Assurance M.A. Economics B.A. Economics	Quality Assurance/ Quality Control	Socioeconomics; Environmental Justice; Protection of Children	35 years environmental science and consulting

LIST OF REPOSITORIES——



LIST OF REPOSITORIES

GRISSOM AIR RESERVE BASE (ARB) REPOSITORIES

- Peru Public Library, 102 East Main, Peru, IN 46970
- Kokomo-Howard County Public Library Main, 220 N. Union, Kokomo, IN 46901

SEYMOUR JOHNSON AIR FORCE BASE (AFB) REPOSITORIES

- Wayne County Public Library, 1001 E Ash St., Goldsboro, NC 27530
- Seymour Johnson AFB Library, 1520 Goodson St., Bldg. 3660, NC 27531

TINKER AFB REPOSITORIES

- Midwest City Public Library, 8143 E. Reno Ave., Midwest City, OK 73110-7589
- Del City Library, 4509 SE. 15th St., Del City, OK 73115
- Tinker Library, 6120 Arnold St., Bldg. 5702, Tinker AFB, OK 73145

WESTOVER ARB REPOSITORIES

- Chicopee Public Library, 449 Front St., Chicopee, MA 01013
- Ludlow Public Library, 24 Center St., Ludlow, MA 01056
- South Hadley Public Library, 2 Canal St., South Hadley, MA 01075

THIS PAGE INTENTIONALLY LEFT BLANK

GLOSSARY



GLOSSARY

24-Hour Exposure Level (L_{eq24}): The L_{eq24} metric is equivalent to L_{Adn} but does not add a decibel weighting factor to late-night noise events. The decibel weighting factor is relevant to estimating annoyance, but is not relevant to the physical mechanisms that can result in hearing impairment.

A-Weighted Day-to-Night Average Sound Level (L_{Adn}): A baseline day-to-night average sound level.

A-Weighted Maximum Sound Level (L_{Amax}): L_{Amax} is the highest sound level that occurs during a single aircraft overflight. For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level as the aircraft recedes into the distance. Federal Aviation Administration Order 1050.1E defines L_{Amax} as a single event metric that is the highest A-weighted sound level measured during an event.

Above Ground Level (AGL): Altitude expressed in feet measured above the ground surface.

Accident Potential Zone (APZ): An area near a runway that is based on historical military accident and operations data and the application of a margin of a safety that represents those areas where an accident is most likely to occur. APZs are normally 3,000 feet wide and extend up to 15,000 feet from the end of the runway.

Acoustic Night: The period between 10 P.M. and 7 A.M. when 10 decibels is added to aircraft noise levels due to increased sensitivity to noise at night.

Asbestos-containing Material (ACM): Any material containing more than 1 percent asbestos.

Air Force Instruction (AFI): Instructions implementing U.S. laws and regulations, and providing policy for USAF personnel and activities.

Air Combat Command (ACC): The U.S. Air Force Command that operates combat aircraft assigned to bases within the contiguous 48 states, except those assigned to Air National Guard and the Air Force Reserve Command.

Air Installations Compatible Use Zones (AICUZ): A land-use-planning program, used by the military, to protect the health, safety, and welfare of those living near military airfields while preserving the defense flying mission. AICUZ presents noise zones and accident potential zones for military airfields and recommendations for compatible land use.

Air Mobility Command (AMC): AMC, a major command with headquarters at Scott Air Force Base, Illinois. AMC provides America's Global Reach. This rapid, flexible, and responsive air mobility promotes stability by keeping America's capability and character highly visible.

Air Force Reserve Command (AFRC): AFRC, a major command with headquarters at Robins Air Force Base, Georgia. AFRC is the federally controlled Air Reserve Component of the U.S. Air Force.

Air Quality: The degree to which the ambient air is pollution-free, assessed by measuring a number of indicators of pollution.

Beddown: The provision of facilities and other necessary infrastructure to support a new mission or weapon system.

Bird/Wildlife-Aircraft Strike Hazard (BASH): A U.S. Air Force program to reduce the possibilities of bird or wildlife collisions with aircraft.

Clean Air Act (CAA): This Act empowered the U.S. Environmental Protection Agency to establish standards for common pollutants that represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety to protect public health and safety.

Clean Water Act (CWA): The primary federal law in the United States governing water pollution. The CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution, and ensuring that surface waters would meet standards necessary for human sports and recreation.

Clear Zone (CZ): An accident potential zone constituting the innermost portions of the runway approach.

Council on Environmental Quality (CEQ): The Council is within the Executive Office of the President and is composed of three members appointed by the President, subject to approval by the Senate. Members are to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs of the nation; and to formulate and recommend national policies to promote the improvement of environmental quality.

Day-Night Average Sound Level (DNL): DNL is a noise metric combining the levels and durations of noise events and the number of events over an extended time period. It is a cumulative average computed over a 24-hour period to represent total noise exposure. DNL also accounts for more intrusive nighttime noise, adding a 10 dB penalty for sounds after 10:00 P.M. and before 7:00 A.M. DNL is the Federal Aviation Administration's (FAA) primary noise metric. FAA Order 1050.1E defines DNL as the yearly day/night average sound level.

Decibel (dB): A sound measurement unit.

De Minimis Threshold: The minimum threshold for which a conformity determination must be performed for various criteria pollutants in various areas.

Endangered Species: The Endangered Species Act of 1973 defined the term "endangered species" to mean any species (including any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature) that is in danger of extinction throughout all or a significant portion of its range.

Environmental Justice: Pursuant to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, review must be made as to whether a federal program, policy, or action presents a disproportionately high and adverse human health or environmental effect on minority and/or low-income populations. Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, review must be made as to whether a federal program, policy, or action presents a risk to infants and children. Due to age-related physiological differences in types and levels of exposure, the evaluation of environmental impacts to children (youth under 18) is different from the evaluation of environmental impacts to adults (e.g., because children breathe more rapidly than adults and their bodies are not yet fully developed, they have different responses to environmental impacts).

Fiscal Year: U.S. Government accounting year beginning 1 October through 30 September.

Groundwater: Water held underground in the soil or in pores and crevices in rock.

Floodplain: An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.

Hazardous Material: Solids, liquids, or gases that can harm people, other living organisms, property, or the environment.

Hazardous Waste: Waste that poses substantial or potential threats to public health or the environment. In the United States, the treatment, storage and disposal of hazardous waste is regulated under the Resource Conservation and Recovery Act.

Integrated Noise Model (INM): The INM is the preferred model typically used for Federal Aviation Regulations Part 150 noise compatibility planning and for Federal Aviation Administration Order 1050 environmental assessments and environmental impact statements. INM is a computer model that evaluates aircraft noise impacts in the vicinity of airports. It is developed based on the algorithm and framework from SAE AIR 1845 standard, which used Noise-Power-Distance data to estimate noise accounting for specific operation mode, thrust setting, and source-receiver geometry, acoustic directivity and other environmental factors. The INM can output noise contours for an area or noise level at pre-selected locations. The noise output can be exposure-based, maximum-level-based, or time-based.

Joint Land Use Study (JLUS): A JLUS is a cooperative land use planning effort between military installations and surrounding communities that examines the positive and negative impacts that military installations have on surrounding communities, and vice versa.

Main Operating Base (MOB): A permanently manned, well-protected base with robust infrastructure. MOBs are characterized by command and control structures, enduring family support facilities, and strengthened force protection measures.

Mean Sea Level (MSL): Altitude expressed in feet measured above average sea level.

Military Operations Area (MOA): Airspace below 18,000 feet above mean sea level established to separate military activities from Instrument Flight Rule traffic and to identify where these activities are conducted for the benefit of pilots using Visual Flight Rule.

Mobile Sources: Includes cars and light trucks, heavy trucks and buses, nonroad engines, equipment, and vehicles.

National Ambient Air Quality Standards (NAAQS): NAAQS are established by the U.S. Environmental Protection Agency for criteria pollutants that represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect public health and safety.

National Environmental Policy Act (NEPA): The National Environmental Policy Act of 1969 directs federal agencies to take environmental factors into consideration in their decisions.

National Historic Preservation Act (NHPA): The National Historic Preservation Act of 1966, as amended, established a program for the preservation of historic properties throughout the United States.

National Register of Historic Places (NRHP): The NRHP is the Federal government's official list of districts, sites, buildings, structures, and objects deemed worthy of preservation.

NOISEMAP: NOISEMAP is a group of computer programs developed over a number of years by the U.S. Air Force for prediction of noise exposures in the vicinity of a military installation. NOISEMAP is the primary computer model used by the U.S. Department of Defense for evaluating military fixed-wing aircraft noise. It contains a suite of computer programs for prediction of noise exposure from aircraft flight, maintenance, and ground runup operations. NOISEMAP output includes noise contours, noise levels at preselected locations, and other

supplemental metrics to assist users in analyzing impacts resulting from aircraft noise in the airfield environment.

Operation: An operation consists of a single activity such as a landing or a takeoff by one aircraft. Each time a single aircraft flies into a different airspace unit, one operation is counted. During a single sortie, an aircraft could fly in several airspace units and conduct a number of operations; therefore, the number of operations exceeds the number of sorties.

Power Setting: The power or thrust output of an engine in terms of kilonewtons thrust for turbojet and turbofan engines or shaft power in terms of kilowatts for turboprop engines.

Primary Aerospace Vehicles Authorized (PAA): PAA consists of the aircraft authorized and assigned to perform a U.S. Air Force wing's mission.

Prime Farmland: Prime farmlands are designations assigned by the U.S. Department of Agriculture. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used as cropland, pastureland, rangeland, forest land, or other land, but cannot be used as urban built-up land or water.

Region of Influence (ROI): The geographic scope of potential consequences in an area.

Scoping: A National Environmental Policy Act process of identifying the main issues of concern at an early stage in planning in order to discover any alternatives and aid in site selection.

Sortie: A sortie consists of a single military aircraft flight from the initial takeoff through the final landing and includes all activities that occur during that mission. For this EIS, the term sortie is used when referring to the quantity of aircraft operations from the airfield. A sortie can include more than one operation.

Sound Exposure Level (SEL): Sound Exposure Level (SEL) accounts for both the maximum sound level and the length of time a sound lasts. It provides a measure of the total sound exposure for an entire event. Federal Aviation Administration Order 1050.1E defines SEL as a single event metric that takes into account both the noise level and duration of the event and references to a standard duration of one second.

State Historic Preservation Office (SHPO): State department responsible for assigning protected status for cultural and historic resources.

Threatened Species: A species likely to become endangered within the foreseeable future throughout all, or a significant portion, of its range.

Traditional/Cultural Resource: Traditional and cultural resources are any prehistoric or historic district, site or building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes.

Wetland, Jurisdictional: A jurisdictional wetland is a wetland that meets all three U.S. Army Corps of Engineers' criterion for jurisdictional status: appropriate hydrologic regime, hydric soils, and facultative to obligate wetland plant communities under normal growing conditions.

INDEX



INDEX

A

ACM 1-9, 2-48, 3-21, 3-45, 3-77, 3-103,
3-104, 4-18, 4-20, 4-42, 4-43, 4-44, 4-72,
4-73, 4-74, 4-101, 4-102, 4-103
AFRC ... 1-1, 1-2, 1-3, 2-1, 2-3, 2-6, 2-7, 2-8,
2-9, 2-14, 2-17, 2-22, 2-25, 2-32, 2-35,
2-38, 2-39, 3-10, 3-20, 3-23, 3-101,
3-106, 4-6, 5-28
AICUZ 2-4, 2-57, 3-2, 3-5, 3-11, 3-17,
3-26, 3-35, 3-42, 3-55, 3-74, 3-87, 3-94,
3-101, 4-36, 4-61, 4-99
AMC 1-2, 1-3, 2-2, 2-3, 2-5, 2-6, 2-8,
2-14, 2-22, 2-25, 2-32, 2-39, 3-9, 3-10,
3-33, 3-34, 3-61, 3-62, 3-93, 4-19
annual emissions 3-8, 3-31, 3-60, 3-91,
4-9, 4-33
APZ 2-3, 3-35, 3-62, 3-94, 4-12, 4-36,
4-60
archaeological 2-46, 2-53, 3-16, 3-41,
3-72, 3-73, 3-99, 3-100, 4-15, 4-39, 4-69,
4-98
auxiliary airfield 4-31, 4-33, 5-1

B

BASH 2-44, 2-57, 3-10, 3-14, 3-34, 3-38,
3-62, 3-68, 3-93, 3-96, 4-11, 4-12, 4-14,
4-15, 4-35, 4-38, 4-60, 4-66, 4-68, 4-93,
4-96

C

CAA 2-3, 3-6, 3-7, 3-31, 3-59, 3-91
CEQ 1-5, 2-1, 2-41, 2-52, 4-108, 5-1, 5-2
construction 1-9, 2-1, 2-3, 2-4, 2-6, 2-8,
2-12, 2-20, 2-22, 2-29, 2-35, 2-38, 2-41,
2-44, 2-45, 2-46, 2-47, 2-48, 2-52, 2-53,
2-55, 2-56, 2-57, 3-7, 3-14, 3-18, 3-19,
3-22, 3-28, 3-30, 3-36, 3-37, 3-42, 3-43,
3-45, 3-55, 3-58, 3-59, 3-60, 3-63, 3-64,
3-66, 3-76, 3-77, 3-87, 3-91, 3-102,
3-105, 4-1, 4-6, 4-7, 4-8, 4-10, 4-12, 4-13,
4-14, 4-15, 4-16, 4-17, 4-18, 4-20, 4-21,
4-22, 4-24, 4-25, 4-30, 4-31, 4-32, 4-34,
4-35, 4-36, 4-37, 4-38, 4-39, 4-41, 4-42,
4-43, 4-44, 4-45, 4-46, 4-49, 4-55, 4-56,
4-57, 4-59, 4-60, 4-61, 4-62, 4-65, 4-67,

4-68, 4-69, 4-70, 4-71, 4-72, 4-73, 4-74,
4-75, 4-77, 4-82, 4-88, 4-89, 4-90, 4-92,
4-93, 4-94, 4-95, 4-96, 4-97, 4-98, 4-100,
4-101, 4-102, 4-103, 4-104, 4-105, 4-106,
4-108, 4-109, 4-110, 5-1, 5-4, 5-6, 5-7,
5-8, 5-11, 5-12, 5-13, 5-14, 5-20, 5-21,
5-22, 5-23, 5-24, 5-28, 5-29, 5-30

CWA 2-56, 3-36
CZ 2-3, 3-11, 4-12, 4-36, 4-60

D

dB ... 2-4, 2-44, 2-46, 3-2, 3-4, 3-5, 3-6, 3-17,
3-24, 3-26, 3-27, 3-28, 3-29, 3-30, 3-42,
3-49, 3-51, 3-52, 3-53, 3-55, 3-56, 3-57,
3-59, 3-74, 3-80, 3-83, 3-84, 3-86, 3-87,
3-89, 3-90, 3-101, 3-107, 3-109, 4-1, 4-2,
4-4, 4-5, 4-6, 4-14, 4-16, 4-24, 4-25, 4-26,
4-28, 4-29, 4-30, 4-38, 4-40, 4-46, 4-49,
4-51, 4-52, 4-53, 4-55, 4-66, 4-70, 4-77,
4-79, 4-82, 4-83, 4-84, 4-86, 4-87, 4-99,
4-106, 4-107, 4-108, 4-109
demolition 1-9, 2-1, 2-8, 2-12, 2-20, 2-22,
2-29, 2-35, 2-38, 2-41, 2-44, 2-46, 3-19,
3-21, 3-45, 3-66, 3-77, 3-102, 4-6, 4-12,
4-14, 4-15, 4-18, 4-20, 4-21, 4-36, 4-37,
4-39, 4-41, 4-42, 4-43, 4-44, 4-60, 4-65,
4-66, 4-68, 4-69, 4-71, 4-72, 4-73, 4-74,
4-93, 4-95, 4-96, 4-97, 4-98, 4-101,
4-102, 4-103, 4-104, 5-4, 5-6, 5-7, 5-14,
5-20, 5-24, 5-28, 5-30

DoD 1-6, 2-2, 2-3, 2-7, 2-14, 2-22, 2-25,
2-32, 2-38, 2-40, 2-48, 3-2, 3-5, 3-17,
3-22, 3-26, 3-28, 3-29, 3-30, 3-46, 3-55,
3-57, 3-78, 3-87, 3-90, 3-105, 4-5, 4-10,
4-12, 4-18, 4-19, 4-22, 4-29, 4-34, 4-35,
4-41, 4-42, 4-45, 4-53, 4-59, 4-60, 4-72,
4-75, 4-87, 4-92, 4-93, 4-100, 4-101,
4-104, 4-109, 5-12

E

employment 1-2, 1-5, 3-22, 3-46, 3-78,
3-79, 3-104, 3-105, 4-8, 4-22, 4-32, 4-45,
4-56, 4-75, 4-89, 4-105
endangered 2-3, 2-45, 3-15, 3-40, 3-70,
3-71, 3-98, 4-15, 4-66

ERP 2-48, 3-13, 3-37, 3-45, 3-67, 3-78,
3-96, 3-104, 4-44, 4-65, 4-74, 4-75,
4-103, 4-104
excavation 4-12, 4-36, 4-61

F

flight operations 1-8, 2-1, 2-8, 2-41, 3-9,
3-33, 3-61, 3-93, 4-1, 4-10, 4-11, 4-25,
4-26, 4-34, 4-35, 4-49, 4-68, 5-1
floodplain 2-45, 2-53, 3-13, 3-35, 3-37,
3-67, 3-71, 3-72, 3-96, 4-14, 4-62, 4-63,
4-65, 4-68, 4-95
FONPA 2-45, 4-61, 4-65

G

GHG 3-7, 3-8, 3-9, 3-31, 3-33, 3-60, 3-61,
3-91, 3-92, 4-10, 4-34, 4-35, 4-59, 4-92
groundwater 2-48, 3-13, 3-37, 3-66, 3-67,
3-78, 3-96, 3-104, 4-14, 4-21, 4-44, 4-65,
4-74, 4-75, 4-103, 4-104

H

HAP 3-7, 3-92
hazardous material 2-48, 2-57, 3-20, 3-35,
3-44, 3-76, 3-77, 3-94, 3-103, 4-19, 4-20,
4-21, 4-42, 4-43, 4-44, 4-73, 4-74, 4-102,
4-103, 4-110, 4-111, 5-3, 5-6, 5-7, 5-9,
5-13, 5-14, 5-17, 5-23, 5-24, 5-26, 5-29,
5-30
hazardous waste 2-48, 3-21, 3-45, 3-78,
3-102, 3-104, 4-18, 4-20, 4-21, 4-42,
4-43, 4-44, 4-72, 4-73, 4-74, 4-101,
4-102, 4-103, 4-110, 4-111, 5-7, 5-14,
5-24, 5-31
historical 1-8, 2-46, 3-9, 3-33, 3-61, 3-93,
4-41, 4-44, 4-75, 4-104

I

infrastructure 1-1, 1-8, 2-1, 2-3, 2-4, 2-5,
2-6, 2-8, 2-9, 2-12, 2-16, 2-20, 2-25, 2-29,
2-35, 2-41, 2-46, 2-47, 2-50, 3-1, 3-16,
3-40, 3-48, 3-70, 3-71, 3-72, 3-99, 3-100,
4-1, 4-8, 4-10, 4-16, 4-18, 4-19, 4-25,
4-32, 4-38, 4-39, 4-40, 4-42, 4-46, 4-49,
4-57, 4-60, 4-62, 4-63, 4-68, 4-70, 4-72,
4-73, 4-74, 4-76, 4-82, 4-90, 4-92, 4-99,
4-101, 4-102, 4-110, 5-1, 5-3, 5-6, 5-7,

5-8, 5-9, 5-13, 5-14, 5-17, 5-23, 5-24,
5-26, 5-29, 5-30

J

JLUS 3-18, 3-42, 3-74, 3-101, 4-70, 5-12
JP-8 3-77, 4-103

K

KC-135 1-2, 1-3, 1-4, 2-1, 2-6, 2-7, 2-8,
2-9, 2-14, 2-16, 2-17, 2-20, 2-22, 2-23,
2-25, 2-29, 2-30, 2-32, 2-33, 2-35, 2-44,
2-48, 2-50, 3-2, 3-3, 3-6, 3-8, 3-9, 3-10,
3-26, 3-28, 3-30, 3-32, 3-33, 3-34, 3-36,
3-44, 3-53, 3-55, 3-59, 3-60, 3-61, 3-62,
3-93, 4-1, 4-2, 4-6, 4-8, 4-11, 4-19, 4-21,
4-25, 4-26, 4-30, 4-31, 4-32, 4-33, 4-35,
4-40, 4-43, 4-46, 4-49, 4-51, 4-55, 4-56,
4-57, 4-60, 4-62, 4-69, 4-70, 4-73, 4-76,
4-89, 4-108, 5-4, 5-12, 5-20

L

L_{Adn} 2-44, 2-46, 3-2, 3-4, 3-5, 3-6, 3-17,
3-24, 3-26, 3-27, 3-28, 3-29, 3-30, 3-42,
3-49, 3-51, 3-52, 3-55, 3-56, 3-57, 3-59,
3-74, 3-80, 3-83, 3-84, 3-87, 3-89, 3-90,
3-101, 3-107, 3-109, 4-1, 4-2, 4-4, 4-5,
4-6, 4-14, 4-16, 4-24, 4-25, 4-26, 4-28,
4-29, 4-30, 4-38, 4-40, 4-46, 4-49, 4-51,
4-52, 4-53, 4-55, 4-66, 4-70, 4-77, 4-79,
4-82, 4-84, 4-86, 4-87, 4-88, 4-99, 4-106,
4-107, 4-108, 4-109, 5-29
landfill 3-21, 3-43, 3-75, 3-77, 3-103,
3-104, 4-42, 4-43
LBP 1-9, 2-48, 2-57, 3-20, 3-21, 3-45,
3-77, 3-104, 4-18, 4-20, 4-42, 4-43, 4-44,
4-72, 4-74, 4-101, 4-103
low-income 2-50, 3-24, 3-49, 3-80, 3-81,
3-107, 3-109, 4-46, 4-47, 4-77, 4-106,
4-107, 4-111

M

minority 2-50, 3-24, 3-49, 3-80, 3-81,
3-107, 3-109, 4-46, 4-47, 4-77, 4-106,
4-107, 4-111

N

NAAQS..... 2-44, 3-6, 3-7, 3-8, 3-31, 3-59,
3-60, 3-91, 4-6, 4-7, 4-31, 4-55, 4-58,
4-88, 4-91

NEPA 1-5, 1-7, 2-41, 2-42, 3-41, 4-15,
4-69, 4-98, 4-108, 5-1

NO_x 2-44, 3-8, 3-31, 3-60, 3-61, 3-91,
3-92, 4-58, 4-90, 4-91

NRHP 2-46, 3-16, 3-17, 3-41, 3-72, 3-73,
3-99, 3-100, 4-15, 4-39, 4-69, 4-97

O

O₃ 3-6, 3-7, 3-8, 3-91

P

PAA..... 1-1, 2-2, 2-5, 2-6, 2-8, 2-16, 2-20,
2-35, 4-1, 4-25

personnel 1-1, 1-6, 1-8, 2-1, 2-2, 2-5, 2-6,
2-7, 2-8, 2-9, 2-12, 2-14, 2-16, 2-22, 2-25,
2-29, 2-32, 2-33, 2-35, 2-38, 2-40, 2-41,
2-47, 2-48, 2-50, 2-56, 3-2, 3-9, 3-11,
3-20, 3-21, 3-22, 3-23, 3-33, 3-34, 3-44,
3-45, 3-46, 3-48, 3-53, 3-62, 3-71, 3-72,
3-76, 3-77, 3-78, 3-79, 3-80, 3-86, 3-93,
3-95, 3-103, 3-104, 3-105, 3-106, 4-1,
4-7, 4-11, 4-12, 4-17, 4-18, 4-19, 4-21,
4-22, 4-23, 4-25, 4-35, 4-39, 4-41, 4-42,
4-44, 4-45, 4-46, 4-49, 4-60, 4-71, 4-72,
4-75, 4-76, 4-82, 4-91, 4-93, 4-100,
4-101, 4-104, 4-105, 4-106, 4-108, 4-110,
5-1, 5-8, 5-10, 5-11, 5-19, 5-20, 5-27

potable water 2-12, 2-38, 2-46, 3-13, 3-18,
3-37, 3-43, 3-67, 3-74, 3-96, 3-101, 4-17,
4-40, 4-71, 4-99

R

renovation 4-36

ROD 2-46, 2-52

ROI..... 1-7, 2-48, 2-49, 2-48, 2-50, 3-1, 3-7,
3-15, 3-22, 3-23, 3-24, 3-40, 3-46, 3-48,
3-49, 3-70, 3-78, 3-79, 3-80, 3-97, 3-104,
3-105, 3-106, 3-107, 4-1, 4-6, 4-22, 4-23,
4-45, 4-46, 4-47, 4-66, 4-76, 4-77, 4-79,
4-104, 4-105, 4-106

S

school 2-48, 3-17, 3-23, 3-24, 3-30, 3-48,
3-49, 3-57, 3-59, 3-74, 3-79, 3-81, 3-90,
3-106, 4-16, 4-23, 4-46, 4-76, 4-105

SHPO 2-46, 2-53, 3-16, 3-41, 3-73, 3-99,
4-15, 4-39, 4-69

stormwater..... 2-45, 2-47, 2-56, 3-12, 3-13,
3-18, 3-36, 3-37, 3-43, 3-64, 3-66, 3-67,
3-75, 3-95, 4-13, 4-17, 4-36, 4-37, 4-41,
4-61, 4-62, 4-69, 4-71, 4-94, 4-95, 4-100

T

threatened 2-45, 3-15, 3-70, 3-71, 3-98,
4-66

tribal 1-8, 2-46, 4-16, 4-39, 4-69, 4-98

tribe 1-6, 2-46, 3-41, 4-39

U

USACE 2-45, 3-16, 3-67, 3-72, 4-61

USAF ... 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8,
2-1, 2-2, 2-3, 2-4, 2-8, 2-9, 2-16, 2-20,
2-25, 2-33, 2-35, 2-42, 2-44, 2-45, 2-46,
2-48, 2-53, 2-55, 2-57, 3-1, 3-2, 3-5, 3-10,
3-11, 3-12, 3-16, 3-17, 3-18, 3-20, 3-23,
3-26, 3-28, 3-34, 3-35, 3-42, 3-44, 3-45,
3-48, 3-49, 3-53, 3-55, 3-62, 3-63, 3-67,
3-73, 3-74, 3-76, 3-77, 3-79, 3-80, 3-87,
3-90, 3-93, 3-94, 3-100, 3-101, 3-103,
3-104, 3-106, 4-1, 4-5, 4-10, 4-11, 4-12,
4-13, 4-14, 4-15, 4-19, 4-20, 4-21, 4-22,
4-23, 4-24, 4-30, 4-34, 4-35, 4-36, 4-37,
4-39, 4-45, 4-46, 4-47, 4-55, 4-59, 4-60,
4-61, 4-62, 4-66, 4-67, 4-68, 4-69, 4-73,
4-74, 4-75, 4-76, 4-77, 4-79, 4-84, 4-87,
4-91, 4-92, 4-93, 4-94, 4-97, 4-98, 4-102,
4-104, 4-105, 4-106, 5-1, 5-3, 5-13, 5-23,
5-28, 5-29

USEPA 2-56, 3-6, 3-7, 3-8, 3-21, 3-29,
3-31, 3-45, 3-60, 3-61, 3-72, 3-78, 3-91,
3-92, 3-95, 3-104, 4-6, 4-7, 4-8, 4-17,
4-18, 4-20, 4-31, 4-32, 4-40, 4-41, 4-43,
4-56, 4-57, 4-71, 4-72, 4-88, 4-89, 4-94,
4-95, 4-100, 4-102

USFWS .. 2-45, 3-10, 3-15, 3-40, 3-70, 3-71,
3-97, 3-98, 4-15, 4-66, 4-67, 4-96

	W	
wetland.....	3-72, 3-94, 3-95, 3-99, 3-101, 4-69, 4-95	3-92, 3-93, 3-96, 4-11, 4-14, 4-35, 4-38, 4-60, 4-65, 4-66, 4-67, 4-93, 4-95, 4-96, 4-110, 5-7, 5-14, 5-24, 5-30
wildlife	2-44, 2-45, 2-55, 3-9, 3-10, 3-14, 3-33, 3-34, 3-38, 3-61, 3-62, 3-70, 3-71,	